71 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

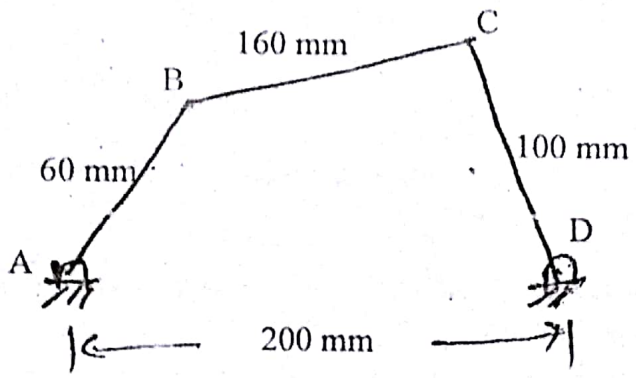
Subject: - Theory of Design and Machine Element *(ME603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

Lochan Poudel

1. a) State Grashuf's law for mechanism and explain the inversion of four bar mechanism. [2+4]

   b) As shown in figure below, the link AB makes and angle of 60° with the fixed line AD and rotates with angular velocity of π rad/sec and angular acceleration of 2 rad/sec^2. The direction of rotation is such that ∠BAD is decreasing. Determine angular velocity and angular acceleration of link BC. [10]



2. a) State and prove the kennedy theorem of three instantaneous centers. [1+5]

   b) A cantilever beam made of carbon steel of circular cross-section of diameter 15 mm is subjected to load which varies from - F to 3F. Determine the maximum load that this member can withstand for an infinite life using factor of safety as 2. The theoretical stress concentration factor is 1.42 and notch sensitivity factor is 0.9. Take ultimate stress = 550 N/mm^2, yield stress = 470 N/mm^2, size factor = 0.85, surface finish factor = 0.89 length of cantilever beam = 150 mm. [10]

3. a) Explain how the theories of failures are incorporate to design a hollow shaft subjected combined axial, bending and twisting load along with considering shock and fatigue factor. [6]

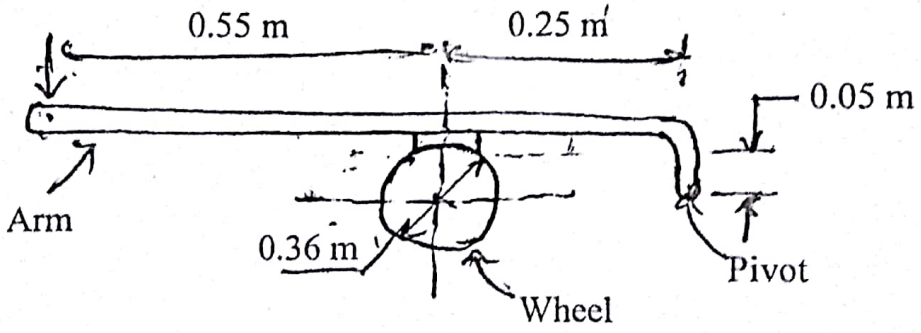
   b) Design a split muff coupling to transmit 10 kw at 1000 opm. The coefficient of friction between the shaft and coupling is 0.25. The allowable shear stress for shaft and key is 50 N/mm^2. The allowable tensile/ compressive strength of bolt is 100 N/mm^2. The allowable shear strength of coupling is 12 N/mm^2. [10]

4. a) Define the terms, rated life, static load rating and dynamic load. Write down the procedure for selection of a suitable ball bearing from the manufacturer's catalogue. [1+1+1

b) A single plate clutch, effective on both sides is required to transmit 33.5 hp at 3000 rpm. Determine the outer and inner diameter of frictional surface if the coefficient of friction is 0.3, ratio of diameters is 1.25 and the maximum pressure is not to exceed 0.1 N/mm^2. Assume the theory of uniform wear.

5. a) Explain how the beam strength of spur gear tooth is calculated according to wilfred Lew's method. Also mention the assumption made for it. [6

b) For the brake as shown in figure below, the coefficient of friction is 0.3. The bearing torsional moment is to be 346 Nm. Determine: (i) The force 'p' for anti clockwise rotation (ii) The force 'p' for clockwise rotation (iii) Where must the pivot be placed to make the brake self is locking?



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(chitwan)

71 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
amination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Theory of design and Machine Element *(ME603)*

Candidates are required to give their answers in their own words as far as practicable.
Attempt <u>All</u> questions.
The figures in the margin indicate <u>Full Marks</u>.
Assume suitable data if necessary.

a) Explain the term mechanism with suitable example. Also derive Gruebler's equation for determining degree of freedom for mechanism. [2+4]

b) The crank of a reciprocating engine revolves at a uniform speed of 310 rpm in clockwise direction. The crank and connecting rod are 15 cm and 65 cm long respectively. Find the velocity of piston for crank position at 30° from inner dead center using instantaneous center method. Also find the angular velocity of connecting rod. [10]

a) State and prove the Kennedy's theorem for three instanteneous center. [4]

b) For four bar mechanism ABCD with link AB fixed, the length of links are AD = 62 mm, CD = 175 mm, BC = 112 mm and AB = 200 mm. The crank AD rotates with uniform angular velocity 10 rad/sec clockwise. Draw the velocity and acceleration diagram when ∠ DAB = 60° and point C and D lie on the same side of AB. Find angular velocity and angular accelration of link CD. [12]

a) What is the significance of theories of failure? List the most commonly used theories. Explain how it can be incorporated in the design of machine element subjected to fatigue. [6]

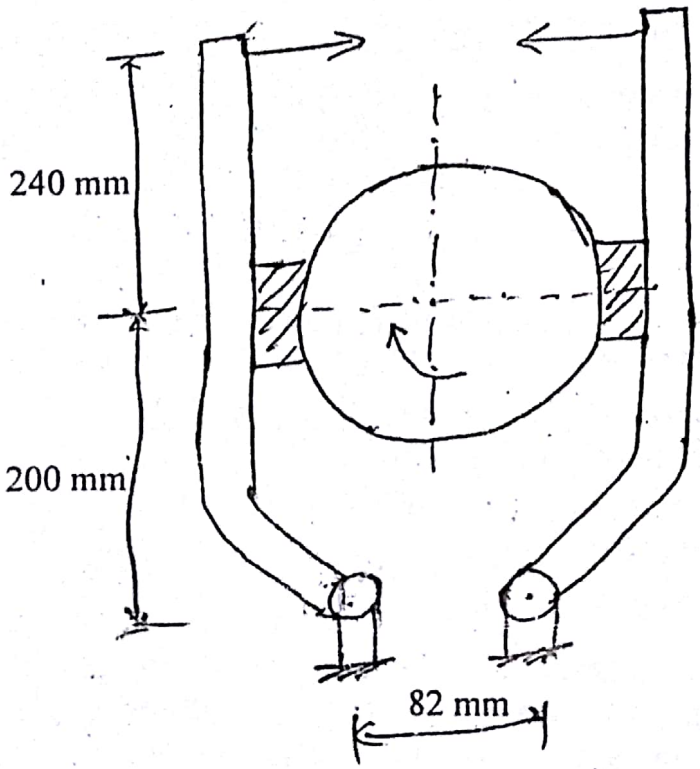
b) Design a shaft to transmit power from an electric motor to a lathe head stoke through a pulley by means of a belt drive. The pulley weighs 200 N, is located at 305 mm from the center of bearing. The diameter of pulley is 200 mm and the maximum power transmitted is 10 KW at 120 rpm. The angle of lap of the belt is 180°and the coefficient of friction between the belt and the pulley is 0.3. The allowable shear stress in the shaft may be taken as 35 N/mm^2. [10]

a) Write down the bearing design factors for journal bearing. Describe the design procedure for journal bearing. [2+4]

b) Design a muff coupling for a shaft transmitting 25 KW at 250 rpm. The safe shear stress for a shaft for the plain carbon steel shaft is 50 N/mm^2 and for the cast iron muff it is 12 N/mm^2. The allowable shear and crushing stresses for the key's materials are 40 N/mm^2 and 80 N/mm^2 respectively. Design torque may be taken as 1.15 times the average torque. [10]

a) How does a coupling differ from a clutch? Describe uniform pressure theory and uniform were theory in the design of disk clutch Which theory is most suitable? [1+4+1]

b) A double shoe brake as shown in figure is capable of absorbing a torque of 1400 N-m. The diameter of the drum is 355 mm and the angle of contact for each shoe is 100°. If the coefficient of friction between the break drum and the lining is 0.4. Find (i) The force necessary to set the brake (ii) The width of brake, if the bearing pressure on the lining material is not to exceed 0.3 N/mm^2. [10]



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71 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Theory of Design and Machine Element *(ME603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

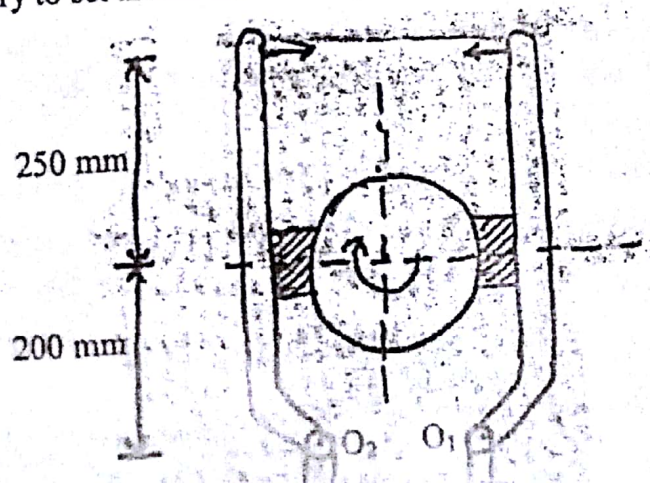
1. a) Define kinematic pair. Explain the various types of kinematic pair giving at least one distinguishing feature of each. [6]
   b) PQRS is a four bar chain link with link PS fixed. The length of links are PQ = 62 mm, QR= 175 mm, RS = 112.5 mm and PS = 200 mm. The crank PQ rotates at 10 rad/sec clockwise. Draw velocity diagram when $\angle QPS = 60°$ and Q and R lies on the same side of PS. Find angular velocities of the links. [10]

2. a) Define coriolis acceleration component and derive it. [6]
   b) A cantilever beam of 200 mm span of rectangular cross section of depth 80 mm is subjected to a transverse load at its free end that fluctuate between 800 N downwards and 2 KN upwards. Determine the width of beam. [10]

3. a) Explain the effect of mean (tensile) as well as (compressive) stress on fatigue behaviors of metal. Show on diagram and state the Goodman, Soderberg and Gerber relationships proposed for design of machine elements subjected to fatigue. [6]
   b) A shaft 30 mm diameter is transmitting power at a maximum shear stress of 80 N/mm^2. If a pulley is connected to the shaft by means of a key. Find the dimension of the key so that the stress in the key is not to exceed 50 N/mm^2 and length of the key is 4 times the width. [10]

4. a) What is theories of failure. Explain how you use the theories of failure for ductile and brittle material. [6]
   b) A shaft 90 cm diameter between bearing supports a 60 cm diameter pulley 30 cm to the right of the left hand bearing and belt drives a pulley directly below. Another pulley 45 cm in diameter is located 20 cm to the left of the right hand bearing and the belt is driven from a pulley horizontally to the right. The angle of contract for both pulleys is 180° and the tension ratio is 2.2. The maximum tension in the belt on a 60 cm diameter pulley is 2250 N. Determine the suitable diameter for a solid shaft. Take $f_t = 63\ N/mm^2$ and $f_s = 42\ N/mm^2$. [10]

5. a) Derive an expression for total frictional torque transmitted by a disc clutch. [8]
   b) A double shoe brake as shown in figure below is capable of absorbing a torque of 1400 N.m. The diameter of brake down is 350 mm and angle of contact for each shoe is 100°. If the coefficient of friction between the brake drum and lining is 0.4. Find the force necessary to set the brake. [8]



72 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Ashad

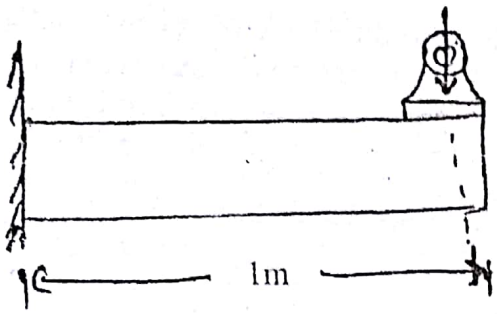
Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

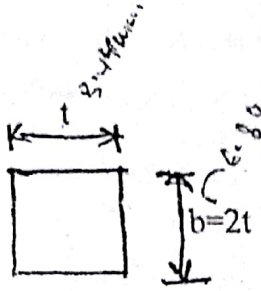
Subject: - Theory of design and Machine Element *(ME 603)*

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt any **Five** questions.*
- *The figures in the margin indicate **Full Marks**.*
- *Students are allowed to use Design Data Hand Book.*
- *Assume suitable data if necessary.*

1. a) Discuss the factors which affect the endurance strength of a component. [6]

   b) When a motor is mounted on a beam as shown in figure below, it is observed that the end of the beam is subjected to a completely reversible load of 15KN. The span of the beam is 1m. The material of beam is C40 steel. Determine the dimensions of the beam. The stress concentration factor at wall is 1.5 and modified endurance strength is 190N/mm^2. Take factor of safety 1.5. [10]





2. a) What are the different criteria of designing a shaft? [6]

   b) The shaft of a rolling machine is driven by a motor, which is placed horizontally. The diameter of the shaft pulley is 800mm and has belt tensions of 5.4KN and 1.8KN on tight side and slack side respectively. The weight of the pulley is 15KN. Design suitable diameter of shaft. Take the shaft material as C45 and factor of safety as 3. [10]

3. a) Describe the design procedure of sunk key. [6]

   b) Design a muff coupling to transmit 10Kw at 1000rpm. The materials of shaft and key are to be C20 and C15 respectively. The shear stress for the cast iron muff is 36N/mm^2. Take factor of safety as 3. [10]

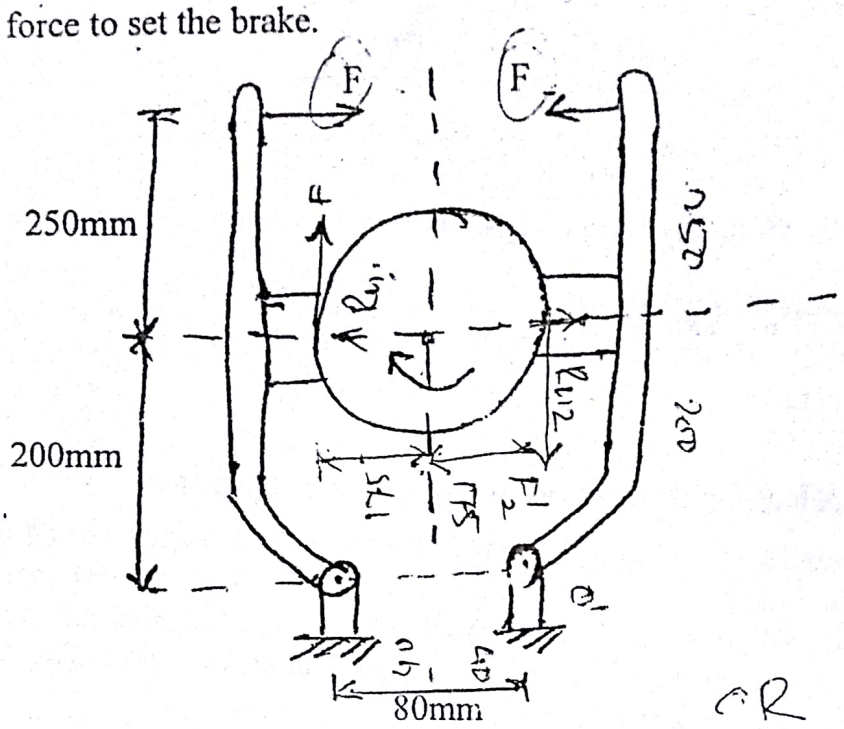
4. a) Explain the stability chart of the journal bearing. [10]

   b) A radial ball bearing has a dynamic load rating of 50KN. If the desired rating life of the bearing is 6000hrs, what equivalent radial load can the bearing carry at 500rev/min. [6]

5. a) Explain instantaneous center of velocity and Kennedy's theorem. [6]

   b) A double shoe brake as shown in figure is capable of absorbing a torque of 1400N-m. The diameter of brake drum is 350mm and angle of contact for each shoe is 100°. If

the coefficient of friction between the brake drum and the linning is 0.4. Find the necessary force to set the brake. [10]



6. a) Define contact length. What is its limit? What is interference involute profile? [6]

b) A motor shaft rotating at 1440rpm has to transmit 15KW power to a low speed shaft rotating at 500 rpm. A 20° pressure angle involute tooth gear-pinion is used. The pinion has 25 teeth. Both gear and pinion are made of cast iron having allowable strength of 55N/mm^2. Design a suitable gear. Take, Lewis form factor for 20° full-depth involute gear, $Y = \pi\left(0.154 - \frac{0.912}{T}\right)$, service factor = 1.25. [10]

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72 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

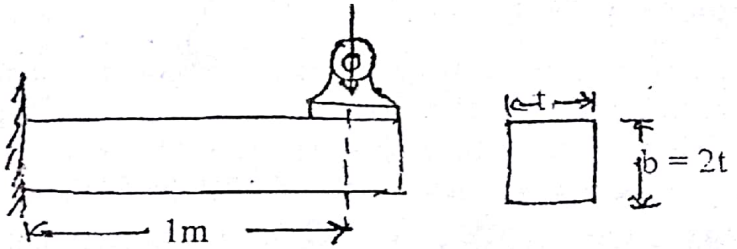
Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Theory of Design of Machine Element *(ME 603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) What do you mean by stress concentration? How is it accounted in design of machine elements? [3+3]

   b) When a motor is mounted on a beam as shown in figure below, it is observed that the end of the beam is subjected to a completely reversible load of 15KN. The span of the beam is 1m. The material of beam is C40 steel. Determine the dimensions of the beam. The stress concentration factor at wall is 1.5 and modified endurance strength is 190N/mm^2. Take factor of safety 1.5. [10]



2. a) Does a hollow shaft more or less resistance to bending than a solid shaft of the same diameter? Explain. [6]

   b) Determine the required diameter of a shaft which carries two pulleys. It is 600mm long and simply supported at two ends and the two pulleys are so located that they divide the shaft in three equal parts. Belt pull on the left pulley is 12KN vertical while the pull on the right pulley in 12KN horizontal. The shaft transmits a torque of 2KN-m between pulleys. The shaft material is C45 steel. Take factor of safety 3. [10]

3. a) Describe the design procedure of muff coupling. [6]

   b) Design a rectangle key which is required to transmit 25KW at 100 rpm. The shaft is made of plain carbon steel C30 and the factor of safety is 2.0. [10]

4. a) What do you mean by hydrodynamic lubrication? Explain it. [6]

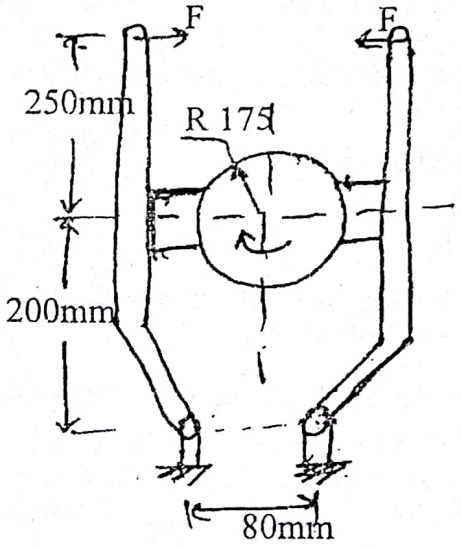
   b) Select a suitable bearing with inner race rotating and having a 10 second work cycle as under. [10]

For 3S	**For 7S**
Fr = 40KN	Fr = 20KN
Fa = 20KN	Fa = 0
N = 900rpm	N = 1200 rpm
Light shock	Steady load

The average expected life is 5000h. The shaft diameter is 75mm. Take X = 0.56 and Y = 1.99, service factor = 1.0 for steady load and 1.5 for light shock.

5. a) Which clutch transmit more power, cone clutch or plate clutch? Explain. [6]

b) For a double shoe brake to absorb 5KW at 700 rpm as shown in figure, find the necessary force to set the brake if the coefficient of friction at contact surface is 0.4 and angle of contact for each shoe is 100°. [10]



6. a) What condition must be satisfied in order that a pain of spur gears may have a constant velocity ratio? Explain it. [6]

b) A certain gear pair in a machine tool gear box is required to transmit 7.5KW. The driving gear runs at 600rpm and the speed reduction is 3. A 20° pressure angle in volute tooth gear-pinion is used. The pinion has 25 teeth. Both gear and pinion are made of cast iron having allowable strength of 55N/mm^2. Design a suitable gear drive. Take Lewis form factor for 20° full-depth involute teeth $y = \pi\left(0.154 - \frac{0.912}{T}\right)$ service factor = 1.25. [10]

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73 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Ashadh

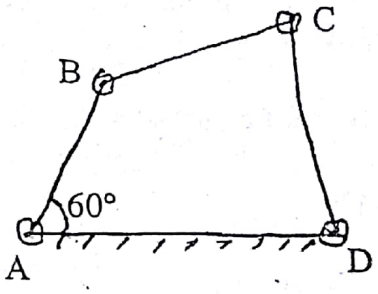
Exam.	Regular/Back		
Level	BE	Full Marks	80
Programme	B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Theory of Machines

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

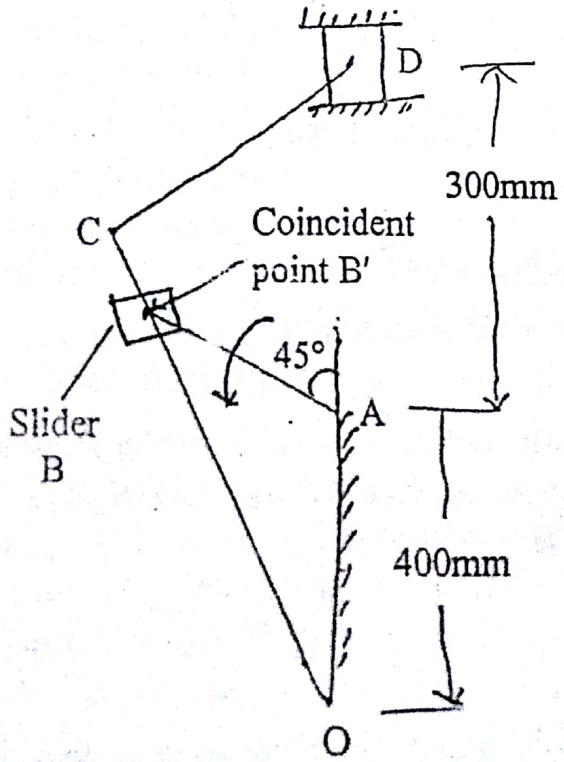
1. a) What do you mean by inversion of mechanism? Explain any two inversion of 4 bar chain. [6]

   b) In a pin jointed four bar mechanism, as shown in figure below, AB = 300mm, BC = CD = 360mm and AD = 600mm. Take angle BAD = 60°. The crank AB rotates uniformly at 100 rpm. Locate all instantaneous centres and find the angular velocity of the link BC. [10]



2. a) State and prove the law of three centre. [6]

   b) A mechanism of crank and slotted lever quick return motion is shown in figure below. If crank rotates counter clockwise at 120 rpm, determine for configuration shown, velocity, acceleration of ram D and angular acceleration of slotted lever. Crank, AB = 150mm, slotted arm, OC = 700mm and CD = 200mm. [10]



3. a) Define cam and follower. Explain the various types of follower with neat figures. [8]

   b) Explain the displacement, velocity and acceleration diagram for simple harmonic motion of follower. [8]

4. a) Show that velocity of sliding is proportional to the distance of the point of contact from the pitch point of mating gear. [8]

   b) The turning moment diagram for a petrol engine is drawn to following scales: turning moment 1mm = 5 N-m, crank angle 1mm = 1°. The turning moment diagram repeats itself at every half revolution of engine and areas above and below the mean turning moment line taken in order are 295, 685, 40, 340, 960, 270mm^2. The rotating parts are equivalent to mass of 36kg at the radius of gyration of 150mm. Determine the coefficient of fluctuation of speed when engine runs at 1800 rpm. [8]

5. a) Derive the equation for equilibrium speed of Hartnell governor. [8]

   b) The weights of four masses W_1, W_2, W_3 and W_4 are 200 kgf, 300 kgf, 240 kgf and 260 kgf respectively. The corresponding radii of rotation are 20cm, 15cm, 25cm and 30cm and the angle α, β and γ are 45°, 75° and 135°. Find the position and magnitude of the balance weight required if radius of rotation is 20cm. [8]

6. Write short notes on: (any four) [4×4]

   a) Kennedy theorem of three instantaneous centre
   b) Gyroscopic motion
   c) Functions of flywheel and governor
   d) Frequency of damped vibration
   e) Difference between machine and structure

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INSTITUTE OF ENGINEERING

Examination Control Division

2073 Chaitra

		Regular	
Level	BE	**Full Marks**	80
Programme	B. Agri.	**Pass Marks**	32
Year / Part	III / I	**Time**	3 hrs.

Subject: - Soil Mechanics and Foundation Engineering *(CE608)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Define soil and soil types. Also illustrate the historical development of soil mechanics. [4+4]

   b) The following index properties were determined from two soils X and Y: [8]

Property	X	Y
Liquid limit	0.62	0.34
Plastic limit	0.26	0.19
Water content	38%	25%
Specific gravity of solids	2.72	2.67
Degree of saturations	1.00	1.00

   Which of these soils

   i) Contains more clay particles?
   ii) Has a greater wet density?
   iii) Has a greater dry density?
   iv) Has a greater void ratio?
   Give reason with your answer.

2. a) Define unified soil classification system. Also explain the importance of soil classification system. [4+4]

   b) State the permeability on layered deposit. The following results were obtained from the sand replacement method:

   Mass of soil extracted from whole: 4.0 kg
   Water content of soil: 18%
   Mass of dry soil to fill hole: 3.1 kg
   Mass of dry sand to fill container of volume 4.2 liters: 5.8 kg

   Calculate the wet and dry densities of the soil. If the specific gravity of the particles is 2.68, find the degree of saturation of the soil. [2+6]

3. a) Define principle of effective stress. A soil profile consists of a surface layer of sand 4.0 m thick (γ = 17 KN/m^3) and intermediate layer of clay 3.0 m thick (γ = 19 km/m^3) and the bottom layer of gravel 4.0 m thick (γ = 18.5 KN/m^3). The water level is at the upper surface of clay layer. Determine the effective pressure at various levels immediately after the placement of a surcharge load of 59 KN/m^3 to the ground surface. [2+6]

   b) Define principle plane and principles stress. Explain vane shear test with figure. [2+6]

Lochan poudel 071 - BAG-24

4. a) What are the differences between compaction and consolidation? Derive the pressure void relationship. 4

   b) With the help of motor-circle, explain active earth pressure for cohesionless soil. A wall with a smooth vertical back and 10 m high retains a mass of moist cohesionless sand that has horizontal surface. The sand weight 1.5 gm/cc and has an angle of internal friction of 36° (i) Determine the total earth pressure at rest and its location (ii) If the water table rises to the ground surface determine the increase in earth pressure. Take Ko = 1-sinϕ and $\Upsilon\omega = 10$ KN/m^3 5

5. a) Explain the factors affecting types of foundation. Write the criteria of spread and mat foundation application. 6

   b) Explain the types of shear failure. A R.C.C column footing square in shape rests 1.5 m below the ground level. The total load to be transmitted including the weight of the column is 200 tones. As the area is subjected to frequent flooding the friction of the footing along the sides is to be neglected and a factor of safety 2.5 is to allowed. If the saturated density of sand is 1.8 gm/cm^3 and for $\phi = 33°$, $N_q = 32$ and $N_y = 33$. Find the suitable size of the footing for the above conditions.

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75 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Soil Mechanics and Foundation Engineering *(CE608)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the objective of soil-mechanics. Also explain the Civil Engineering problems associated with soil-mechanics? [5+3]

   b) By the three phase soil-system, show that the degree of saturation "Sr" (as ratio) in terms of mass unit weight (γ_m) water content ratio of (ω) and specific gravity of soil (G) and unit weight (γ_w) is given by the expression $S_r = \dfrac{\omega}{\frac{\gamma_w}{\gamma_m}(1+\omega) - \frac{1}{G}}$ [8]

2. a) Explain the uses of particle size distribution curve. Also explain the coefficient of uniformity and coefficient of curvature. [5+3]

   b) What are the various methods of field compaction of soils? Also explain how compaction is related to permeability of soil. [5+3]

3. a) What is shearing strength of soil along horizontal plane at a depth of 4 m in a deposit of sand having the following properties? Angle of internal friction = 35°, Dry unit weight of soil = 17 KN/m^3, specific gravity of solids = 2.70. Assume ground water table is at depth of 2.5 m from ground level and sand above water table is dry. Also find the change in shear strength when the water table raises upto the ground level. [8]

   b) Explain the properties of flow net. Describe the remedial measures to control the quick condition. [4+4]

4. a) How the consolidation is different than compaction. A clay layer 2.5 m thick is underlain by a layer of sand 4 m in thickness. The clay has a compression index of 0.22 and saturated unit weight of 18 KN/m^3. The initial void ratio of clay is 1.30. Calculate the final settlement of the clay layer due to an increase in pressure of 30 KN/m^3 at center of clay layer. Also calculate the settlement when the water table rises to the ground surface. [8]

   b) Explain active, passive and at rest pressure in retaining wall. Also explain how Mohr-circle for active pressure is drawn for retaining wall. Derive the related equation. [3+5]

5. a) Explain the requirements for obtaining the satisfactory foundation. Also differentiate shallow and deep foundation. [5+3]

   b) A footing 1.5 m diameter carries a load of 800 KN. The soil (c=0) has an angle of internal friction of 36° and an effective unit weight 12 KN/m^3. What will be the depth of foundation? If F = 2.5 for $\phi = 36°$, $N_q = 38$ and $N_r = 41$. [8]

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75 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Soil Mechanics and Foundation Engineering *(CE608)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the historical development of soil and describe the uses of soil in agriculture engineering.

   b) Dry sand of 10676 gm is poured fully into a cylinder having internal diameter of 200mm and height of 200mm. The porosity of the sand is 35%. Water is carefully added until the sand becomes saturated. While the porosity remains the same. Determine:
      i) The saturated density of the soil
      ii) The amount of water needed to saturate the soil
      iii) The specific gravity of sand particles
      iv) The water content of the sand at saturated condition
      v) The amount of water needed to produce a degree of saturation of 80%

2. a) Explain the importance of soil classification and explain any two of the following : [2+3
      i) Textural classification system
      ii) Boundary classification system
      iii) Unified soil classification system.

   b) Describe the types of soil water. Also describe the factors affecting permeability of soil. [4

3. a) Explain flow nets and their application. A soil deposit consists of an upper layer of 3 m thick having unit weight of 18 KN/m^3 and lower layer of 4 m thick having unit weight of 22 KN/m^3. Determine the total stress, pore water pressure and effective stress at the bottom of the lower layer (i,e at 7 m below ground surface) if the water table is: [2
      i) 1 m below the ground surface
      ii) Exactly at the ground surface
      iii) 1 m above the ground surface

   b) Explain shear strength and factors contributing shear strength. Enlist the various lab shear tests and explain direct shear test with diagram. [3

4. a) Explain the difference between compaction and consolidation. Also illustrate Tarzaghils piston spring Analogy for primary consolidation. [3

   b) The height of retaining wall with smooth vertical back is 4 m. The backfill has a horizontal surface in level with top of the wall and carries a uniformly distributed sucharge of 20 KN/m^2. The unit weight angle of internal friction and cohesion is 19KN/m^3; 30° and zero respectively. Determine the magnitude and point of application of the total active earth pressure per meter length of the wall. If the water table rises behind the wall to an elevation of 2.5 m from the bottom, what would be the total active pressure?

5. a) Explain the factors affecting types of foundation. Also differentiate shallow and deep foundation with neat sketches. [3

   b) For a certain soil the cohesion C is 50 KN/m^2, the unit weight is 19.2 KN/m^3 and bearing capacity factors are N_c = 8, N_q =3 and N_y = 2. Calculate the net ultimate bearing capacity for strip footing of width 1.25 m and depth 1 m, considering shear failure only. Calculate the safe load on a footing 6 m long by 1.25 m wide using a factor of safety of 3.0.

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75 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Soil Mechanics and Foundation Engineering *(CE608)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) How is soil formed? Explain two of them. [4]

   b) A partially saturated soil sample from an earth fill has a natural moisture content of 20 percent and bulk unit weight of 1.8 gm/cc. The specific gravity of solids is 2.70. Determine the degree of saturation and void-ratio. If the sample gets saturated subsequently, determine its unit weight. [12]

2. a) How is soil classified according to unified soil classification system? Write in brief. [6]

   b) In a constant head permeability test the following observations were taken: length of specimen = 180 mm; Difference of water level = 350 mm; Diameter of the test sample = 150 mm; quality of water collected = 500 ml; Duration of the test = 500 seconds. Determine the coefficient of permeability of the soil. [10]

3. Explain effective stress principle. A soil profile consists of a surface layer of clay 8 m thick; having the bulk-density 30KN/m^3 and a second layer of 5 m thick; having the bulk-density of 29 KN/m^3 overlying an impermeable rock. The water table is at the ground surface. If the water level in a stand pipe driven into the sand layer rises 3 m above the ground surface, calculate the effective stress at the various sections. Take $\gamma_w = 10$ KN/m^3. [1+7]

4. Explain Mohr-coulomb failure theory of shear strength. Explain it with its limitations. [8]

5. Explain the pressure void relationship in consolidation. A clay layer 2.5 m thick is underlain by a layer of sand 4 m in thickness. The clay has a compression index of 0.22 and saturated units weight of 18 KN/m^3. The initial void ratio of clay is 1.30. Calculate the final settlement of the clay layer due to an increase in pressure of 30 KN/m^2 at center of clay layer. Also calculate the settlement when the water table rises to the ground surface. [2+6]

6. A wall with a smooth vertical back and 10 m high retains a mass of moist cohesionless sand that has horizontal surface. The sand weights 1.5 gm/cc and has an angle of internal friction of 36° (a) determine the total earth pressure at rest and its location (b) If the water table rises to the ground surface, determine the increase in earth pressure at rest. Take $K_o = 1-\sin\phi$ and $\gamma_w = 10$ KN/m^3. [8]

7. Explain the factors affecting types of foundation. What are the various types of shear failures. A footing of 1.5 m diameter carries a load of 800 KN. The soil (C =0) has an angle of internal friction of 34° and an effective unit weight of 10 KN/m^3. What will be the depth of foundation; if F = 2.5 ? For $\phi = 34°$; take $N_q = 38$ and $N_y = 41$. [4+2+10]

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76 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs

Subject: - Soil Mechanics and Foundation Engineering *(CE608)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What are the different types of soil? Write down the importance of soil mechanics and foundation engineering in agriculture sector.
2. What are different index proper of soil? A moist soil sample weighs 3.52N. After drying in an oven, its weight is reduced to 2.9N. The specific gravity of solids and the mass specific gravity are 2.65 and 1.85 respectively. Determine, the water content, void-ratio, porosity and the degree of saturation. Take $Y\omega = 10\ KN/m^3$.
3. a) What are different soil classification systems? Explain I.S. soil classification system.
   b) Write down the methods of determination of coefficient of permeability.
4. a) Write down the method of compaction control.
   b) Explain flow net and their applications. A sand deposit consists of two layers. The top layer is 5m thick (ρ=2000 kg/m^3) and bottom layer is 6.0 m thick (ρ=2500kg/m^3). The water table is at a depth of 6 m from the surface and zone of capillary saturation is 2 m above the water table. Calculate the effective stress at the bottom of each layer.
5. Define shear strength of soil. Explain principle plane and principle stresses. Explain the tri-axial test for shear strength.
6. What are the consolidation tests performed in laboratory? Explain one of them.
7. What is a retaining wall? How can the stability of earth retaining structures be analysed? Elaborate it with permissible factor of safety.
8. a) What are the factors affecting types of foundations. Explain one of them.
   b) A square footing (6m×6m) carries a total load including its own weight of 10,000 KN. The base of the footing is at a depth of 3 m below the ground surface. The soil strata at the site consist of a layer of stiff fully saturated clay 27.5 m thick overlying dense sand. The average bulk density of the clay is 19.2 KN/m^3 and its average shear strength is 130 KN/m^2. Determine: (i) Gross foundation pressure (ii) Net foundation pressure and (iii) Factor of safety.

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77 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	B. Agri	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Soil Mechanics and Foundation Engineering

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a) What are the uses of soil? Derive the various relations in terms of porosity with the help of three phase diagram of soil. [2+6]

   b) The mass specific gravity of a fully saturated specimen of clay having a water content of 40% is 1.88. On oven drying, the mass specific gravity drops to 1.74. Calculate the specific gravity of clay. [8]

2. a) What are the different soil classification systems? Write down the differences between index properties and engineering properties of soil. What are the tests which indicate the index and engineering properties of soil? [2+2+4]

   b) Differentiate between compaction and consolidation. What are the various factors affecting compaction? Describe the various laboratory tests conducted in lab for determination of the permeability of soil. [2+2+4]

3. a) What is quick sand condition? Derive a relation of effect of surcharge and submergence on quick sand condition. [2+6]

   b) Define shear strength of soil. Explain Mohr-Coulomb failure theory. Write down the direct shear test method for determination of shear strength of soil. [1+3+4]

4. a) What is flow net? What are the applications of flow net? Discuss how the seepage discharge can be known through flow net? [1+3+4]

   b) What is Rankine's earth pressure theory? Write down the assumptions for it? How Coulomb's active pressure in cohesionless soil is determined graphically? [1+2+5]

5. a) Explain the various modes of foundation failure? Write down the assumptions made for Terzaghi's general bearing capacity theory. [4+4]

   b) Explain how bearing capacity is determined by conducting a plate load test at the site? [8]

6. Write short notes on: (any four) [4×4]
   a) Types of water in soils
   b) Types of slope failure
   c) Types of earth pressure
   d) Prevention of piping failure
   e) Spread footing

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76 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.		Regular	
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Soil Mechanics and Foundation Engineering *(GE 608)*

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt any all questions.*
- *The figures in the margin indicate Full Marks.*
- *Assume suitable data if necessary.*

1. a) Write down the process of soil formation.

   b) What is difference between index and engineering properties of soil? A soil sample has a water content of 10% and a unit weight of 20KN/m^3. If the specific gravity of solid is 2.70, determine the dry unit weight, void-ratio and the degree of saturation. Take Y_w = 10KN/m^3. [2+

2. a) How is soil classified by unified soil-classification system?

   b) What are the various factors affecting permeability? Explain different types of soil-water.

   c) Explain the process of consolidation test with diagram.

3. a) Illustrate the engineering significance of compaction.

   b) Define effective stress principle. A sand deposit consists of two layers. The top layer is 3m thick (ρ = 1815kg/m^3) and bottom layer is 4.0m thick (ρ_{sat} = 2088kg/m^3). The water table is at a depth of 4m from the surface and zone of capillary saturation is 1.0m above the water table. Calculate the effective stress at the various sections. [2+

4. a) State Mohr-Coulomb failure theory. Write down the procedure of direct share test.

   b) Why is a foundation necessary for a structure? Explain the difference between shallow foundation and deep foundation.

5. a) The height of a retaining wall with smooth vertical back is 4m. The backfill has a horizontal surface in level with top of the wall and carries a uniformly distributed surcharge of 20KN/m^2. The density, angle of internal friction and cohesion is 19KN/m^3, 30° and zero respectively. Determine the magnitude and point of application of the total active earth pressure per meter length of the wall. If the water-table rises behind the wall to an elevation of 2.5m from the bottom, what would be the total active pressure?

   b) What are the different types of shear failure? Explain in brief safe, ultimate, net safe bearing and permissible bearing capacity of soil. [2

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76 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Lochan poudel
077-BAG-24

Subject: - Hydrology and Agricultural Metrology *(AE603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Write the scope of hydrology and it's application in Agricultural Engineering. [3+3]
   b) Explain: hydrologic equation". [3]
   c) Following are the data of a storm as recorded at a station: [7]

Time from the beginning of storm (minutes)	10	20	30	40	50	60	70	80	90
Cumulative rainfall (mm)	19	41	48	68	91	124	152	160	166

   i) Plot the hyetograph of the storm at 30 minutes time step.
   ii) Plot the maximum intensity duration curve of the storm.

2. a) What are the methods to estimate amount of water evaporated from a water surface. Also write the methods to reduce evaporation from the lake. [4+4]
   b) The mass curve of rainfall of 100 min duration is given below. If the storm produced runoff of 2.50 cm at the outlet of the basin, estimate the ϕ-index of the storm and duration of rainfall excess. [8]

Time from start of rainfall (min)	0	20	40	60	80	100
Cumulative rainfall (cm)	0	0.5	1.2	2.6	3.3	3.5

3. a) Briefly describe the rating curve. [8]
   b) A small stream has a trapezoidal cross section with base width of 12 m and side slope 2 horizontal: 1 vertical in a reach of 8 km. During a flood the high water levels recorded at the ends of the reach are as follows. [8]

Section	Elevation of bed (m)	Water surface elevation (m)	Remarks
Upstream	100.20	102.70	Mannings
Downstream	98.60	101.30	n = 0.030

   Estimate the discharge in the stream.

4. a) Write the methods for base flow separation. [2]
   b) Given below are the stream flow from a catchment area of 20 km^2 due to a storm of 1-hr duration. Find the surface runoff hydro graph ordinates from an effective rainfall 6 cm duration 1 hour. [14]

Time (hr)	0	1	2	3	4	5	6	7	8	9	10
Stream flow cm^3/sec	15	25	50	55	48	35	30	27	24	20	15

5. a) Write down the measures to control the flood. 6

b) Analysis of the annual flood peak data of a river, covering a period of 21 years yielded a mean of 8520 m^3/s and a standard deviation of 3900 m^3/s. A proposed water control project on this river near this location is to have an expected life of 40 years. Policy decision of the project allows an acceptable reliability of 85%.

i) Using Gumbel's method recommended the flood discharge for this project

ii) If a safety factor for flood magnitude of 1.3 is desired, what discharge is to be adopted? What would be the corresponding safety margin?

$\left(\bar{y}_n = 0.5252 \text{ and } s_n = 1.0696\right)$

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77 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Hydrology and Agricultural Meteorology *(AE603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Define hydrology. From the given data of a storm, determine the maximum intensity-duration of the storm. [4+4]

Time (min)	0	10	20	30
Cu.r.f (mm)	0	8	15	25

b) Why consistency test of a recorded data is done? The normal annual precipitation of five raingauge stations P,Q,R,S and T are 125, 102, 76, 113 and 137 mm respectively. During a particular storm, the precipitation recorded by stations P.Q,R and S are 13.2, 9.2, 6.8 and 10.2 cm respectively. The instrument at station T was inoperative during that storm. Estimate the rainfall at station T during that storm. [2+6]

2. a) Write the methods to reduce evaporation losses. What are methods to estimate the amount of water evaporated from a water surface? [4+4]

b) The mass curve of rainfall of 100 minutes duration is given below. If the catchment had an initial loss of 0.6 cm and the total surface runoff was 2.5 cm, estimate the ϕ-index of the storm and duration of rainfall excess. Also determine the w-index of the storm. [8]

Time from start of rainfall (minute)	0	20	40	60	80	100
Cumulative rainfall (cm)	0	0.5	1.2	2.6	3.3	3.5

3. a) How the current meter is calibrated? [8]

b) During a high flow, water surface elevation of a small stream were noted at two sections A and B, 10 km apart. These elevations and other salient hydraulic properties are given below. [8]

Section	Water surface elevation (m)	Area of cross section (m^2)	Hydraulic radius (cm)	Remarks
A	104.771	73.293	2.733	A is upstream of B
B	104.500	93.375	3.089	n = 0.020

The eddy loss co-efficients of 0.3 for gradual expansion and 0.1 for gradual contraction are appropriate. Estimate the discharge in the stream.

4. a) Write the uses of unit hydrograph. [2]

b) The stream flows due to three successive storms of 3.5, 4.5 and 2.5 cm of 6 hours duration each on a basin. Assuming a constant base flow of 10 cumecs and an average storm loss of 0.25 cm/hr, derive the ordinates of flood hydrograph and also area of the basin. [14]

Time (hr)	0	3	6	9	12	15	18	21	24
3 hrs-UGO (cumec)?	0	4	4	12	12	6	2	2	0

5. a) What are factors affecting runoff? [8]

b) The regression analysis of a 30 years flood data at a point on a river yielded sample mean of 1200 m^3/s and standard deviation of 650 m^3/s. For what discharge would you design the structure to provide 95% assurance that the structure would not fail in the next 50 years? Use Gambel's method. The value of the mean and standard deviation of the reduced variate for N = 30 are 0.53622 and 1.11238 respectively. [8]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Hydrology and Agricultural Meteorology *(AE603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Briefly describe precipitation. What are the criteria for selection of rain gauge station?

   b) For a drainage basin of 600 km^2, isohyetals drawn for a storm gave the following data:

Isohyetals (Interval (cm)	15-12	12-9	9-6	6-3	3-1
Inter isohyetal area (km^2)	92	128	120	175	85

   Estimate the average depth of precipitation over the catchment.

2. a) Distinguish between actual and potential evapotranspiration.

   b) What do you mean by pan-coefficient? A class A pan was set up adjacent to a lake of average area of 50 km^2 over a year. The normal annual rainfall at the place is 120 cm and the pan evaporation is 240 cm. Assuming the land flooded by the reservoir has a runoff coefficient of 0.4, estimate the net annual increase or decrease in the stream flow as a result of the reservoir.

3. a) What are the factors affecting runoff.

   b) The following data were collected during a stream gauging operation in a river. Compute the discharge.

Distance from left water edge (m)	Depth (m)	Velocity (m/s)	
		at 0.2 d	at 0.8 d
0.0	0.0	0.0	0.0
1.5	1.3	0.6	0.4
3.0	2.5	0.9	0.6
4.5	1.7	0.7	0.5
6.0	1.0	0.6	0.4
7.5	0.4	0.4	0.3
9.0	0.0	0.0	0.0

4. a) Write the base flow separation method.

   b) From a given 2 hr-UGO, derive the flood hydrograph of two storms, each of 1 cm rainfall excess and 1-hr duration occur in succession.

Time (hr)	0	1	2	3	4	5	6	7
2 hr.UGO (m^3/sec)	0	2.5	6.5	6.5	4.0	2.0	0.5	0

5. a) How the current meter is calibrated?

   b) Data covering a period of 92 years for the river yielded the mean and standard deviation of the annual flood series as 6437 and 2951 m^3/sec respectively: (i) Using Gumbel's method estimate the flood discharge with a return periods of 500 years. (ii) What are the confidence limits for this estimate and (iii) If a safety factor for flood magnitude of 1.3 is desired what discharge is to be adopted? What would be the corresponding safety margin?

$\bar{y}_n = 0.5589, s_n = 1.2020$ and $f(c) = 1.96$

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76 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

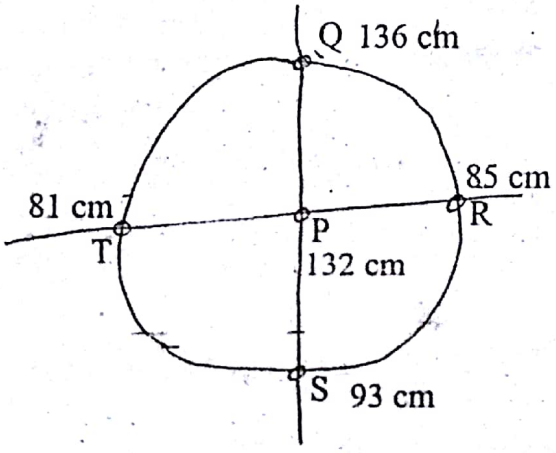
65/80

Subject: - Hydrology and Agricultural Meteorology *(AE603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Briefly describe precipitation. Write the criteria for selecting raingauge site. [4+4]

   b) For a given drainnage basin of dia. 4 cm in the scale as shown in figure below, determine the average depth of rainfall of the basin by (i) arithmetic and (ii) thiessen mean method. [8]



2. a) Describe the Penman's equation for estimating the potential evapotrainspiration. [8]

   b) A reservoir had an average surface area of 20 km^2 during june 2003. In that month the mean rate of inflow = 10 m^3/s, outflow = 15 m^3/s, monthly rainfall = 10 cm and change in storage 16 million m^3. Assuming the seepage losses to be 1.8 cm, estimate the evaporation in that month. [8]

3. a) Explain the procedure for obtaining the stage discharge relationship of a stream by using the stage discharge data from a site with permanent control. [8]

   b) The following data were collected for a stream at a gauging station. [8]

Distance from one end of water surface (m)	Depth of water (m)	Velocity m/sec		
		at 0.6 d	at 0.2 d	at 0.8 d
0	0	-	-	-
1.2	6.7	0.4	-	-
2.4	1.7	-	0.7	0.5
3.6	2.5	-	0.9	0.6
4.8	1.3		0.6	0.4
6.0	0.5	0.35	-	-
7.2	0	-	-	-

Compute the discharge of the stream.

4. a) Write the methods of base flow separation.

   b) The stream flows due to three successive storm of 3.5, 4.5 and 2.5 cm of 6 hours duration each on a basin are given below. The average storm loss of 0.25 cm/hr. Derive the ordinates 6- hours unit hydrograph for the basin.

Time (hr)	0	3	6	9	12	15	18	21	24	27	30	33	36	39
Stream flow (cumecs)	10	14	18	32	46	54	58	49	36	25	17	12	11	10

5. a) Briefly describe runoff with its components.

   b) For a river, the estimated flood peaks for two return periods by the use of Gumbel's method are as follows:

Return period (years)	Peak flood (m^3/s)
100	435
50	395

What flood discharge in this river will have a return period of 1000 years?

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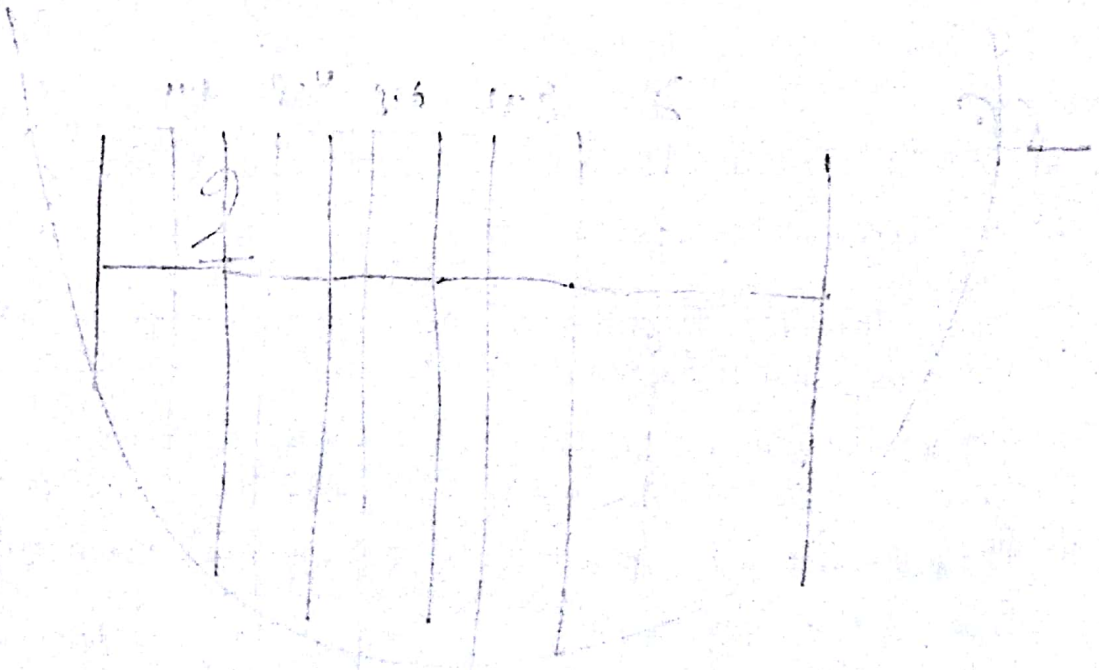

INSTITUTE OF ENGINEERING

Examination Control Division

2069 Chaitra

Level	BE	**Full Marks**	80
Programme	B. Agri.	**Pass Marks**	32
Year / Part	III / I	**Time**	3 hrs.

Subject: - Hydrology and Agricultural Meteorology *(AE603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Briefly describe about the form of precipitation. [8]

   b) The normal annual precipitation of five rain gauge stations P,Q,R,S and T are respectively 125, 102, 76, 113 and 137 cm. During a particular storm the precipitation recorded by stations P, Q, R and S are 13.2, 9.2, 6.8 and 10.2 cm respectively. The instrument the rainfall at station T was inoperative during that storm. Estimate the rainfall at station T during that storm. [8]

2. a) Briefly describe about evaporation and evaporatransperation process. [8]

   b) Estimate the PET of an area for the season November to February in which wheat is grown. The area is at a latitude of 30°N with mean monthly temperatures and monthly daytime hours percentages as below: [8]

Month	Nov	Dec	Jan	Feb
Temp (°C)	16.5	13.0	11.0	14.5
Pn	7.19	7.15	7.30	7.03

Use the Blanry-Cridle formual and value of k = 0.65 for wheat.

3. a) What is the difference between infiltration rate and capacity? How the Horton's curve is developed by infitrometer? [4+6]

   b) An isolated 3-hr storm occurred over a basin in the following fashion: [6]

% of catchment area (km^2)	ϕ-index (cm/hr)	Rainfall (cm)		
		1st hr	2nd hr	3rd hr
20	1.00	0.8	2.3	1.5
30	0.75	0.7	2.1	1.0
50	0.50	1.0	2.5	0.8

Estimate the hourly run off from the catchment due to this storm

4. a) Explain the procedure for obtaining the stage-discharge relationship of a stream by using the stage-discharge data from a site with permanent control. [8]

   b) A small stream has a trapezoidal cross section of u/s and d/s base width of 12 m and 14 m respectively and side slope 2 horizontal: 1 vertical in a reach of 8 km. During a flood due high water levels recorded at the ends of the reach are as-below: [8]

Section	Elevation of bed (m)	Water surface elevation (m)	Remarks
Upstream	100.20	102.70	Manning's
Downstream	98.60	101.30	n = 0.030

Estimate the discharge in the stream.

5. a) Write the methods of base flow separation:

   b) The ordinates of a 6hr-UGO are given. Derive the flood hydrograph due to a storm of 3.5 cm of 3 hr duration. Assuming a ϕ-index of 0.25 cm/hr and base flow of 30 m^3/sec.

Time (hr)	0	3	6	9	12	15	18	21	24	27
6 hr-UGO (m^3/sec)	0	2	4	8	12	9	4	2	1	0

6. a) Briefly describe runoff with it's components.

   b) A hydraulic structure on a stream has been designed for a discharge of 350 m^3/sec. If the available flood data on the stream is for 20 years and mean and standard deviation for annual flood serious are 121 and 60 m^3/s respectively, calculate the risk value of this structure of life 30 year an expected life 30 year.

   (Note: $\bar{Y}_n = 0.5236$, $S_n = 1.0628$)

$$\hat{Q}_T = \bar{Q} + k_T \sigma_{n-1} \quad ***$$

$$350 = 121 + k_T\, 60$$

$$k_T = 3.8167$$

$$\frac{Y_T - \bar{Y}_n}{S_n} = 3.8167$$

$$\frac{Y_T - 0.5236}{1.0628} = 3.8167$$

$$Y_T = 4.57998876$$

$$-\ln \ln \left(\frac{T}{T-1}\right) = 4.57998876$$

$$T = 1.01T - 1.01$$

$$0.01T = 1.01$$

$$T = 101 \text{ yrs}$$

77 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Hydrology and Agriculture Metrology *(AE 603)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Define hydrology with it's application to Agriculture Engineering. [3+3]

   b) Explain a procedure for checking a rainfall data for consistency. [5+5]

   A catchment area has seven rain gauge stations.

Station	P	Q	R	S	T	U	V
Annual rainfall(cm)	130.0	142.1	118.2	108.5	165.2	102.1	146.9

   For a 5% error in the estimation of the mean rainfall, calculate the minimum number of additional stations required to be established in the catchment. Also find the percentage accuracy in the mean rainfall of the existing network over the basin.

2. a) What are the methods for determining the evaporation and evapotranspiration? [3+3]

   b) Calculate the potential evapotranspiration from an area in the month of November by Penman's formula. The following data are available: [10]

Latitude:	30°N
Elevation:	23m(above sea level)
Mean monthly temp.:	20°C
Mean relative humidity:	75%
Mean observed sunshine hours:	9 hr.
Wired velocity at 2m height:	85 Km/day
Nature of surface cover:	close-ground green crop

   Where, $A = 1.05 mm/°C$, $e_w = 17.54mm$ of Hg, $H_a = 9.1$ mm of water/day, $N = 10.6$ hour. Where symbols have their usual meaning.

3. a) Explain the stream flow measurement by velocity area method. [8]

   b) The characteristics of an isolated 1 hr storm occured over a basin is given below in the table. [8]

% of catchment area	ϕ-index (cm/hr)	Rainfall (cm)	
		First 0.5 hr.	Second 0.5 hr
10	1.0	0.8	1.5
20	1.25	0.75	2.25
30	0.5	1.0	0.8
40	0.75	1.0	1.5

   Calculate total rainfall, total losses and runoff from the catchment.

4. a) What are the causes of flood? Explain various flood mitigation measures in the context of Nepalese rivers.

b) The following are the ordinates of the hydrograph of flow from a catchment area of 770km^2 due to a 12 hr. rainfall.

Time (hr)	0	6	12	18	24	30	36	42	48	54	60	66	72
Discharge(m^3/sec)	50	75	225	370	410	360	280	215	155	110	80	60	50

Derive the ordinates of 12 hr. unit hydrograph.

5. Analysis of the annual flood peak data of a river, covering a period of 21 years yielded a mean of 8520m^3/sec and a std deviation of 3900m^3/sec. A proposed water control projection of this river near this location is to have an expected life of 40 years. Policy decision of the project allows an acceptable reliability of 85%. (a) using Gumbel's method recommend the flood discharge for this project. (b) If a safety factor for flood magnitude of 1.3 is desired, what discharge is to be adopted? What would be the corresponding safety margin? Where $\bar{y}_n = 0.5252$ and $S_n = 1.0696$.

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73 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Tractor System and Control *(AE601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a) How differential works in the agricultural field? Explain the use of differential lock. (5+3)

   b) Explain the importance of ergonomic science in farm machinery and tractor design. (8)

2. a) Describe the functional requirements of a brake system of a tractor and how do you control the power tiller? (5+3)

   b) A 65 Hp engine is running at 1500 rpm. The gear box of tractor is in-line type and a gear on a driving shaft having 40 teeth and it drives the gear having teeth of 60 in the counter shaft. Another gear fitted on the counter shaft having teeth of 30 is operating a gear having teeth of 70 fitted on the power output shaft. Find the torque and speed of output shaft. (8)

3. a) Mention the features of traction devices of tractor. Describe the detail construction of pneumatic tyre with the neat sketch diagram. (3+5)

   b) A single plate clutch which is to be designed for an automobile which developed maximum torque of 115.8 N-m. The external radius and internal radius is taken as 1.25 and the maximum pressure intensity is limited to 80.1 KPa. Assuming uniform rate of wear, determine the clutch facing dimension and the total axial force that most be provided. Take $\mu = 0.25$. (8)

4. a) What is a tractor? Discuss the history of tractor development. (1+7)

   b) Prove the relation $P_{loss} = HV_a + RV_a$ and find the tractive efficiency of tractor. (8)

5. a) Discuss about hydraulic system in a tractor. How positive caster adds directional stability in steering system? (2+4)

   b) A farmer bought a tractor at NRs 1,500,000/ and he wanted to use his tractor for custom hiring. Calculate the operating cost of ploughing and threshing of paddy by mold board and paddy thresher respectively. Assume necessary data and use straight line method for depreciation calculation. (10)

6. Write short note on any four (4*4)

   (i) Power train of a tractor
   (ii) PTO system in a tractor
   (iii) Balasting in a tractor
   (iv) Steering geometry of a tractor
   (v) Center of gravity and stability of tractor
   (vi) Safety in the tractor

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73 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Lochan
071- BAG-2

Subject: - Tractor System and Control *(AE601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. a) Describe the functional requirements of brake and how do you control the power Tiller?
   b) A single dry plate clutch transmitted at 1000 rpm. The axial pressure is limited to 0.07 N /mm^2. If $\mu = 0.30$, calculate:
      i) Mean radius and face width of the friction lining; assume the ratio of the mean radius to the face width as 4.
      ii) Outer and inner radii of the cluth plate
2. a) List out the steering geometry and explain them in detail.
   b) Prove the relation $P_{loss} = HV_S + RV_a$; and what will be the tractive efficiency of tractor.
3. a) Tractor accident is occurring frequently in Nepal and ultimately main victim is the tractor driver, how can you reduce the tractor accident? Describe in brief.
   b) A farmer bought a tractor at Rs. 12,00,000/- and he wanted to use this tractor for custom hiring. Calculate the operating cost for phoughing farm by mould board plough. Assume necessary data and use straight line method for depreciation calculation.
4. a) Why and how ergonomic principle incorporated in tractor design?
   b) Determine the center of gravity of a tractor and explain its importance.
5. a) How differential works in the field? Explain the use of differential lock.
   b) A 35 Hp tractor engine is running at 1500 rpm. The gear box of tractor is in-line type and a gear on the driving shaft having 40 teeth and it drives the gear having teeth of 60 in the counter shaft. Another gear fitted on the counter shaft having teeth of 30 is operating a gear having teeth of 70 fitted on the power output shaft. Find Torque and rotation of output shaft.

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Basudev Adhikari

73 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Tractor System and Control *(AE601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

60/80

1. a) Classify the tractors according to their development and their use.
   b) Explain about inline type sliding gear transmission system with neat sketch diagram.
2. a) What are the functions of final drives? List out their types and explain one of them.
   b) What are the functions of steering system? Name the parts involved in steering system and explain their functions.
3. a) Why human factor is important in tractor design? Explain in brief.
   b) Determine the forces acting on the tractor at static equilibrium conditions.
4. a) What is inflation of tyres? Explain with diagram. Why balasting is done? Explain.
   b) A single plate friction clutch with both sides effective is to transmit 15 KW power at 2000 rpm. The axial pressure is limited to 0.1 N/mm^2. If the outer diameter of the friction lining is 1.5 times the inner diameter, design a suitable dimension for the friction lining. Assume uniform wear conditions. The coefficient of friction may be taken as 0.3.
5. a) List out the types of final drive and explain one of them with neat sketch diagram.
   b) Show the role of traction in agricultural field and prove the relation $\eta_t = \frac{P}{P+R}(1-i)$.
   If we minimizing the rolling resistance and slip upto zero, then what will be the traction efficiency?

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73 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hr

Subject: - Tractor System and Control *(AE601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1 a) Show the importance of brakes in farm tractor and explain the working principle of hydraulic brake system with a neat diagram.

b)Why human factors are consider during tractor design? What are the functions of power tiller and explain the importance of power tiller in Nepal.

2 a) What is the function of steering system and how steering system works? Explain in detail with neat diagram.

b) Find the center of gravity of a tractor by weighing method.

3 a) Why ballasting is done in the tractor? List out the types of ballasting and explain its procedure.

b) What is traction? Write down the traction parameters and explain one of them and write the physical meaning of $\eta_t = [P/(P+R)](1-i)$.

4 a) How do you power harness from tractor for operating different types of implements in the field? Show the types of PTO with neat diagrams and explain them.

b) What are the functions of transmission system? Describe the parallel type transmission system with neat sketch diagram.

5 What is depreciation? Explain about straight line method of depreciation. How you determine the operating cost of the tractor and machines in hour basis (you are asked to determine the cost of operat of rotavator, cultivator and multi crop thresher) write down the procedure in detail.

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7JRE TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Tractor System and Controls *(AE601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1 a) Show the power trains of the tractor with schematic diagram and explain about final drive in details. (8)

b) What parameters do you consider during the tractor design? You are requested by the farmer for selecting the size and types of tractor then how do you select the size and types of tractor explain in detail. (8)

2 a) List out the component of steering system and explain them in detail with the help of neat diagram of steering system. (8)

b) Determine the static equilibrium forces acting on tractor chassis. (8)

3 a) What is air inflation in tractor tyres? Show the types of inflation with neat sketch and explain their advantages and disadvantages. (8)

b) A tractor was tested on a firm surface and observed the following data: (i) Rear wheel weight = 3900 kg (ii) Draw bar pull = 26.2 KN (iii) Distance with no load = 55.8 m (iv) Distance with load = 46.2 m (v) Engine power = 62.1 KW (vi) Fuel consumed =176 g and (vii) Time = 25.8 second, now determine slip, travel speed, rolling resistance if tractive efficiency is 84% and specific fuel consumption. Assume if necessary data is required. (8)

4 a) How do you power harness from tractor for operating different types of implements in the field? Show the types of PTO with neat diagrams and explain them. (8)

b) What are the functions of transmission system? Describe the parallel type transmission system with neat sketch diagram. (8)

5. A farmer is seeking your help (you are an agricultural engineer) for determining the operating cost of a tractor and machines in hour basis with the following information. He is using the tractor for operating rotavator, cultivator and multi crop thresher in the season. The cost of tractor, rotavator, cultivator and multi crop thresher are NRS 10, 50,000.00, 90,000.00, 80,000.00 and 2, 50,000.00 respectively. The life of tractor and other machines are 15 years and working hour per year is 800 and 150 hours respectively. Use the current rate of diesel found in the market and fuel consumed by tractor is 4.5 liters per hour. Charge the housing cost, interest, insurance and taxes 1 %, 16 %, 1 %, 1 % of the machines cost respectively and 10 % of salvage value. Use the straight line method to determine the depreciation cost of the machines (assume necessary data if required). (16)

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam		Regular	
Level	BE	Full Marks	80
Programme	B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Tractor System and Control. *(AE601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a) What is Tractor? Discuss the history of tractor development. [1+3
   b) What do you know about power train. Discuss the constant mesh type gear box with neat sketch. [2+4
   c) Name the different functional linage in steering system with neat sketches. What are the effect of caster and Camber. [4+2
2. a) Why differential is used in tractor power Transmission? Explain its working with neat sketches. [1+5
   b) Explain the working of close centre hydraulic system. [4
   c) Distinguish between hydro static and hydro dynamic drive. What is a torque converter? [4+2
3. a) What are the requirements of good clutch? Discuss the working principle of dry type disc clutch. [2+4
   b) Why differential is needed? Discuss the different types of final drives used in the tractor. [1+5
   c) Why double declutching is needed in constant mesh gear box, explain briefly. [
4. a) Determine the static equilibrium forces acting on the tractor chesis. [
   b) A tractor was tested on a firm surface and observed the following information. [

   i) Rear wheel weight = 3900 kg
   ii) Draw bar pull = 26.2 KN
   iii) Distance no load = 55.8 m
   iv) Engine power = 62.1 KN
   v) Distance with load = 46.2 m
   vi) Fuel consumed = 176 gm
   vii) Time = 25.8 sec

   Determine, the wheel slip, travel speed, drawbar power (HP), tractive efficiency, fuel consumption and specific fuel consumption.
5. a) What is ergonomics? Explain why human factors should be considered in tractor design. [3
   b) Calculate the hire cost of 735 FE swaraj tractor as per the following information
      i) Cost of tractor = NRs 7,00,000/-
      ii) Life of tractor = 15 years
      iii) Yearly working hours = 850
      iv) Operating cost per hour = NRS 50/-
      v) Fuel consumption = 3.5 lit/hr

      Assume necessary data.
6. a) Explain the types of hitches and function of better hitching system.
   b) Explain the weight transfer on the tractor, give the reason for adding extra weight to rear wheel of tractors.
   c) What is power tiller? Mention its type and explain its function.

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74 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Tractor System and Control *(AE 601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the importance of tractor in farm mechanization. [4]
   b) Describe the working principle of hydraulic fluid operated drum type brake. [6]
2. a) Discuss the importance of proper inflation pressure in tractor tyres. [4]
   b) Determine the location of center of gravity of a tractor by weighing method. [6]
3. a) Describe the use of power tiller in context of Nepal. [4]
   b) Prove that the engine power (Q_e) is equals to the draw bar power (Q_d). [6]
4. a) Why differential is used in tractor? Explain its working principle. [4]
   b) A 4 wheel tractor weighing 2700kg has a draw bar horsepower of 26 ps. It plus a traild implement at a speed of 4.4kmph on a level ground. The center of gravity of the tractor is 75cm ahead of rear axel and 105cm above the ground and the wheel base is 220cm. The total contact area of rear wheel is 960cm^2 while the point of hitch is located 40cm above the ground surface and 30cm behind the rear axle. Assuming angle of internal friction as 21 and cohesion coefficient as 0.1kg/cm^2 for the soil, calculate: i) The angle of inclination of the line of pull (ii)Soil reaction at rear and front wheel [6]
5. a) What is the function of steering? List out the components involved in mechanical steering. [4]
   b) Why gear box is necessary in tractor? Show the third gear in constant mesh type gear system. [6]
6. a) Show the importance of PTO system in tractor. [2]
   b) A farmer purchases 35 HP diesel tractor for Rs. 750000. Its total wear out life is 12000 hours and the annual use is 1000 hours. The annual interest rate is 10%. The tractor is being used with an 11 tine cultivator, costing Rs 40000. The sovel spacing is 22.5cm, speed of cultivator is 6 kmph and field efficiency is 75%. Calculate: [8]
      i) Cost of use of tractor in Rs/hour
      ii) Cost of cultivation in Rs/ha
7. a) Explain, how engine power reaches to the tractor wheels. [4]
   b) What is the purpose of hydraulic system in tractor? Show the circuit symbols used in hydraulic circuit. [6]
8. a) Explain the types of hitching system in tractor. Discuss the types of power harness from the tractor. [6]
   b) Why tractor testing is necessary? Explain. [4]

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74 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Ashwin

Exam.	Back		
Level	BE	Full Marks	40
Programme	B. Agri.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Engineering Properties of Bio-Material *(AE602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate* ***Full Marks.***
- ✓ *Assume suitable data if necessary.*

1. How does the engineering properties plays a role in design of food processing equipments. [4]
2. Illustrate about the criteria for describing shape and size of bio-material. Describe any two in detail. [4]
3. What are the methods for determining volume and density of bio-material? Describe any one with neat sketch. [4]
4. Describe sorting of fruits by reflectance method. [4]
5. Illustrate about the significance of electrical properties in food process industry. [4]
6. Describe about the various thermal properties of bio-material. [4]
7. What are the importance of aerodynamic properties in food processing? [4]
8. Describe about the stress-strain behaviour of bio-material. [4]
9. Write short notes on: (any two) [4×2]
   - i) Method of determining angle of repose
   - ii) Method of quality control
   - iii) Nepal standard in food (NS)

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OTI - BAG-24

74 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Agri.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hr

Subject: - Engineering Properties of Bio-Material *(AE602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the different engineering properties of bio-materials and their respective significance to food process engineering? 3
2. Illustrate about the roundness and sphericity of a bio-material. 4
3. What are the different gravimetric properties responsible for determining the status of bio-material? Explain briefly. 3
4. Describe about the significance of colar and gloss in bio-material? 4
5. What are the applications of electrical properties in bio-materials? 4
6. Illustrate about the importance of thermal properties in post harvest operation. 2
7. Is aerodynamic properties important for bio-material? Why? 3
8. Describe about the properties of visco-elastic materials. 1
9. Write short notes on: (any two) 6
   i) Angle of Repose
   ii) Sanitation in food industry
   iii) Concept of quality control

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74 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Agri.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hrs.

Subject: - Engineering Properties of Bio-Material *(AE602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) What are the various engineering properties of bio-materials with their importance? [4]
   b) Describe the importance of geometric properties in detail. [4]
2. a) Describe the specific gravity gradient tube method to determine volume and density of bio-materials. [4]
   b) What are the various optical properties of bio-material? Describe its significance in context of Agri-engineering. [4]
3. a) Describe the electrostatic separation of seed and foreign matters. [4]
   b) Illustrate the importance of thermal properties in detail. [4]
4. a) Describe the importance of Terminal velocity and Drag coefficient of bio-material. [4]
   b) Illustrate the Angle of repose in detail. [4]
5. Write short notes on: [4×2]
   i) TQM and TQC
   ii) Codex Allimantarious commissions

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74 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Agri.	Pass Marks	16
Year / Part	III / I	Time	1 ½ hr

Subject: - Engineering Properties of Bio-Material *(AE602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) List out the engineering properties of bio-material that are used for processing equipment design.
   b) Why is it necessary to measure the geometric properties of bio-materials? How is the shape of irregular material characterized?
2. a) What is the importance of gravimetric properties of bio-material. Discuss the specific gravity gradient tube method to determine the volume and density of bio-material.
   b) What is optical property of bio-materials? Write down the sorting of bio-material by reflectance method.
3. a) What are the electrical properties of bio-materials? Describe the electrostatic separation of seeds and foreign matter.
   b) Describe the longitudinal heat flow method for measurement of thermal conductivity.
4. a) Estimate the terminal velocity of particles of animal feed having an intermediate diameter of 20 cm falling through standard air (moist air having density of 1.2 kg/m^3). Assume the particle is spherical and that it is a piece of corn endosperm at 15% moisture content. The viscosity of standard air is $1.8*10^{-5}$ kg/sec.m, ρ_{corn} = 1300 kg/m^3.
   b) How is viscosity of material measured? Describe capillary tube viscometer method for measuring viscosity.
5. a) Water is subjected to a flex test. Compute the flex modulus if the parameter of test and dimension of the sample are given as follow: width 27 mm, thickness 7 mm, spain length 75 mm, deflection 1.6 mm and force applied 70N.
   b) What are the objectives of quality control in bio-material? Describe codex alimentarius commission (CAC)

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74 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Agri.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Engineering Properties of Bio-Material *(AE602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Four questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Mention the applications of thermal properties of biomaterials. How can you measure the porosity of a biomaterial in lab? [2+3]

   b) Define the terms TQC and TQM. Discuss the principles of HACCP. [2+3]

2. a) What are the methods available for measuring bulk density of porous materials? Establish the relation: [2+3]

$$v_t = \left[\frac{2m(\rho_p - \rho)g}{\rho_p.\rho.c.Ap}\right]^{1/2}$$

   b) Define heat of Respiration. Discuss the optical properties of a biomaterial briefly. [2+3]

3. a) Differentiate between angle of internal and external friction. What are the methods available for measuring thermal conductivity of biomaterials? Explain any one. [1+4]

   b) Why is the knowledge of physical properties of biomaterial important for an agricultural engineer? Calculate the spherecity of a peach having major, intermediate and minor diameters of 58.2 mm, 55.2 mm and 48.8 mm respectively. [2.5+2.5]

4. a) Define the term electrical permitivity. How is the mixture of seeds separated by electrostatic method? [1+4]

   b) What is drag coefficient? Compute the flexural modulus if the parameters of test and dimension of sample are: W = 27 mm t = 7 mm, L = 75 mm, D = 1.6 mm, F = 70 N [1+4]

5. Write short notes on: [10]
   a) Codex Alimentarious commission
   b) Spherecity
   c) Importance of Aerodynamic properties
   d) Angle of Repose

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75 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B.Agri.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Engineering Properties of Bio-Materials *(AE602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Four** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Write down the importance of density in Food processing. Explain the working principle of Specific Gravity Gradient Tube.
   b) What do you mean by HACCP? Write down the objectives of quality control?
2. a) Define the term Food Rheological? The settling velocity of starch granules in water at 70°F was found to be 0.1 mm/sec. If the granules density were 1500 kg/m^3, determine the average diameter of the granules in "mm". If these granules were falling in air, what would be their terminal velocity? [Given viscosity of water 0.98×10^{-3} kg/sec and density of water as 997 kg/m3]
   b) Explain the significance of optical properties of biomaterials. Establish the relation $AC \le KV^{2/3}$.
3. a) What is the effect of moisture content on Angle of Repose? 100gm of apple was heated from 20°C to 30°C for 10 min via the guarded plate method. The voltage and the current to the heater were 0.5v and 12A respectively. Calculate specific heat of apple.
   b) Define thermal diffusivity. Explain different Rheological models of fluid foods.
4. a) Define the terms Roundness and spherecity. How can you separate a seed from a mixture of seeds and foreign matters considering the electrical property?
   b) Define the term Terminal Velocity. State the expression for finding the volume and surface area of prolate and oblate spheroid.
5. Write short notes on:
   a) Flex test
   b) Heat of respiration
   c) The standard diagram
   d) ISO 9000 series

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75 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	B. Agri.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Engineering Properties of Bio-Material *(AE 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Four questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a) Define the term Chroma and Gloss. Explain the significance of engineering properties of Bio-materials in food engineering. [2+3]

   b) Define food Rheology. Calculate the sphericity of a cylindrical object of diameter 1.0cm and height 1.7cm. [1+4]

2. a) What do you mean by TQM? Why is toulene used is pycnometer test of specefic gravity of bio-materials? [2+3]

   b) What do you mean by Heat of Respiration? It is proposed that an air stream be used to separate wheat kernels having terminal velocity of 9.7m/s from O at kernels having terminal velocity of 8.3m/s. What air velocity would you choose? What factor would affect the degree of seperation achieved? [1+4]

3. a) What do you mean by GMPs? The thermal conductivity of an apple is measured at 25°C by Guarded hot plate method. The apple samples are cut into chips with area of 305mm×305mm and thickness of 10mm. The temperature difference between the hot and cold surfaces is kept at 3°C and the measured rate of heat input is 7W. Calculate the thermal conductivity of the apple. [2+3]

   b) Explain the process of electrical heating of food materials. Define the term stress relaxation in food Rheology. [3+2]

4. a) Define Criterion Area. What are the different rheological models for different types of fluid foods? Explain. [1+4]

   b) What are the applications of electrical properties? Explain the objectives of quality control in food industries. [2+3]

5. Write short notes on: [2.5×4]

   a) HACCP
   b) Rheopectic and Thixotropic foods
   c) DLE sorting
   d) Specific gravity gradient tube

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75 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Agri.	Pass Marks	16
Year / Part	III / I	Time	1½ hrs.

Subject: - Engineering Properties of Biomaterials *(AE 602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Four questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a) Define the terms Hue and Gloss. Why is the knowledge of various engineering properties of biomaterials important for an agriculture engineer? Explain. [2+
   b) Define the term permittivity. Calculate the sphericity of a cylindrical object of diameter 1.5cm and height of 2.5cm. [1+
2. a) What do you mean by TQC? Explain. What are the methods of measurement of Bulk density of porous materials? Explain any one method. [2+
   b) Define the term thermal diffusivity. It is proposed that an air stream be used to seperate wheat kernels having terminal velocity of 9.7m/s from Oat kernels having terminal velocity of 8.3m/s. What air velocity would you choose? What factors would affect the degree of separation achieved? [1+
3. a) What do you mean by sensory quality control? Explain. Calculate the specific heat of potatoes having moisture content of 85%, the specific heat of bone dry materials and water being 837.36J/kgK and 4186.80J/kgK respectively. [2+
   b) Define the term 'stress relaxation' in Food Rheology. Explain the process of electrical heating of food materials. [2+
4. a) Define Sphericity. What are the methods of measuring angle of repose? Explain the effect of moisture context in angle of repose. [1+2+2
   b) What do you mean by HACCP? Explain the principles of HACCP. Write down the application of optical properties of biomaterials. [1+2+2
5. Write short notes on: [2.5x4

   a) Codex Alimentarius Commission
   b) Dilatant and Pseudo plastic foods
   c) Heat of Respiration
   d) Surface area measurement of prolate and oblate spheroid

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22 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Ashwin

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistics *(SH602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ ***Necessary tables are attached herewith.***
- ✓ *Assume suitable data if necessary.*

1. What is Box plot and what does it measure? Explain the meaning of its different parts with diagram.

   A civil engineering monitors water quality by measuring the amount of suspended solids in a sample of river water. Over 11 weekdays, he observed 14, 12, 21, 28, 30, 63, 29, 65, 55, 19, 20 suspended solids (parts per million).

   Find the third quartile and interpret its meaning. [3+3]

2. Write sown the difference between the sample space and sample points, dependent and independent events. Urn A contains 2 white 1 black and 3 red balls. Urn B contain 3 white 2 black and 4 red balls. Urn C contain 4 white 3 black and 2 red balls. One Urn is choosen at random and 2 balls are drawn. They happen to be red and black. What is the probability that both come from Urn B. [6]

3. What are the characteristics of Binomial Distribution and how does it differ from Negative Binominal Distribution? [4]

4. A quality control engineer inspects a random sample of 4 batteries from each lot of 24 car batteries that is ready to shipment. If such a lot contain six batteries with slight defects. What are the probabilities that the inspector's sample will contain. [5]

   i) None of the batteries with defect?
   ii) At least two of the batteries with defects?
   iii) At most three of the batteries with defects?

5. The breakdown voltage X of a randomly chosen diode of a particular type is known to be normally distributed with mean 40 volts and variance 2.25 volts. What is the probability that the breakdown voltage will be [5]

   i) Between 39 and 42 volts
   ii) Less than 44 volts
   iii) More than 43 volts

OR

The daily consumption of electric power in a certain city follow a gamma distribution with $\alpha = 2$ and $\beta = 3$. If the power plant of this city has daily capacity of 12 million kilowatt hours, what is the probability that this power supply will be inadequate on any given day?

6. A college professor never finishes his lecture before the bell rings to end the period and always finishes his lectures within one minute after the bell rings. Let X = the time which elapses between the bell and the end of the lecture. Suppose that the p.d.f of X is [5]

$f(x) = kx^2, 0 \le x \le 1$

$= 0$, otherise

i) Find the value of k
ii) What is the probability that the lecture ends with ½ minute of the bell ringing?
iii) What is the probability that the lecture continues beyond the bell for between 15 and 30 seconds?

7. Define Central Limit Theorem. The amount of impurity in a batch of a certain chemical product is a random variable with mean value 4.0 gm and standard deviation 1.5 gm. If 50batches are independently prepared, what is the probability that the sample average amount of impurity is between 3.5 and 3.8 gm? [5]

8. Define population. Sample parameter and statistic with suitable examples. A population consists of 3,7,11,15. Consider all possible samples of size two which can be drawn without replacement from this population. Find population mean and Standard error of mean. [6]

9. What are the two regression coefficients and what do they represent when these two will be same? Write any three properties of regression coefficient. [5]

10. A sample of 8 values of three variables X_1, X_2 and X_3 were obtained as [5]

$\Sigma X_1 = 360$	$\Sigma X_2 = 64$	$\Sigma X_3 = 48$
$\Sigma X_1^2 = 17172$	$\Sigma X_2^2 = 546$	$\Sigma X_3^2 = 320$
$\Sigma X_1 X_2 = 2845$	$\Sigma X_1 X_3 = 2269$	$\Sigma X_2 X_3 = 396$

Find:

i) Partial correlation between X_1 and X_3 eliminating the effect of X_2
ii) Multiple correlation between X_1, X_2 and X_3 assuming X_3 as dependent

11. Discuss difference between estimation and hypothesis test of significance of population [5]

66.3	63.5	64.9	61.9	64.3	64.7	65.1	64.5	68.4	63.2

Find 99% confidence interval for true hardness of magnesium alloy.

12. An examination was given to 50 students at college A and 60 students at college B. At a mean grade was 75 with standard deviation of 9. At B mean grade was 79 with a standard deviation of 7. Is these significant difference between the performance of students at A and those at B, given that $\alpha = 0.05$? [6]

OR

Three randomly selected groups of chickens are fed on three different diets. Each group consists of five chickens. Their weight gains during a specified period of time are as follows:

Diet I	4	4	7	7	8
Diet II	3	4	5	6	7
Diet III	6	7	7	7	8

Test the hypothesis that mean gains of weight due to the three diets are equal.

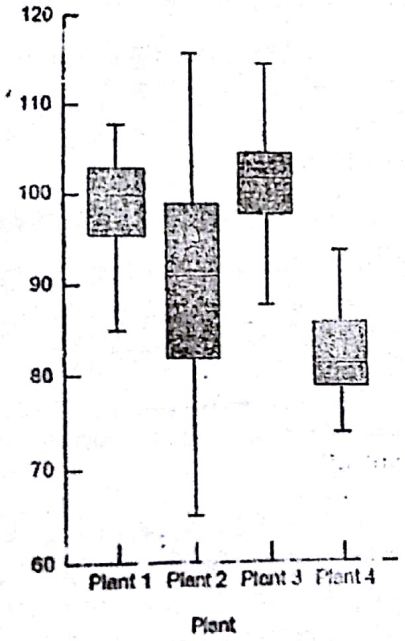
13. A random sample of smokers was obtained and each individual was classified both with respect to gender and with respect to the age at which he/she first started smoking. [5]

Age	Gender	
	Male	Female
<16	25	10
16-17	24	32
18-20	28	17
>20	19	34

Carry out a test of hypotheses to decide whether there might be an association between gender and the age at which an individual first smokes?

14. Explain the concept of (i) point estimation and (ii) Internal estimation of population properties. In a random sample of 400 industrial accidents, it was found that 231 were due to at least partially to unsafe working condition. 95% confidence intervals for the corresponding true proportion. [5]

15. Following multiple box plots shows the quality index at 4 manufacturing plants. Comment on the relationships between quality at different plants and the variability present those 4 plants. [7]



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22 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistics *(SH602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary tables are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. Describe the various measures of central tendency and its application. The following table represents the marks of 100 students. [6]

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	14	18	27	26	15

Find the mean, median and standard deviation of all 100 students.

2. Explain Baye's theorem. A chain of video stores sells three different brands of DVD players; Of its DVD players sales, 50% are brand 1(the least expensive), 30% are brand 2, and 20% are brand 3. Each manufacturer offers a 1-year warranty on parts and labor. It is known that 25% of brand 1's DVD players require warranty repair work, where as the corresponding percentages for brands 2 and 3 are 20% and 10%, respectively. [2+4]
   a) What is the probability that a randomly selected purchaser has bought a brand 1 DVD players that will need repair while under warranty?
   b) What is the probability that a randomly selected purchaser has a DVD player that will need repair while under warranty?
3. Define negative binomial distribution with its important characteristics. [5]
4. If a publisher of nontechnical books takes great pains to ensure that its books are free of typographical errors, so that the probability of any given page containing at least one such error is 0.005 and errors are independent from page to page, what is the probability that one of its 400-page novels will contain. [5]
   a) Exactly one page with errors?
   b) At most three pages with errors?
5. In a certain examination test 2000 students appeared in Statistics. The average marks obtained were 50% and the standard deviation was 5%. How many students do you expect to obtain more than 60% marks? What are the minimum marks of the top 100 students? Assume that the marks are normally distributed. [5]

OR

The daily consumption of water in a certain place follow a gamma distribution with parameters $\alpha = 2$ and $\beta = 3$. If the daily capacity of this city is 9 million gallon of water, what is the probability that on any given day the water supply is inadequate?

6. The distribution function of a random variable x is [5]

$$F(x) = 1 - e^{-2x} \quad \text{for } x \geq 0$$
$$= 0 \quad \text{for } x < 0$$

   a) Find $P(x > 2)$
   b) Find mean and variance of the variable x.

7. What do you mean by central limit-theorem and discuss its applications. [4]

8. An electrical firm manufactures light bulbs that have a length of life that is approximately normally distributed with mean equal to 800 hours and standard deviation of 40 hours. Find the probability that a random sample of 16 bulbs will have an average life of (a) less than 850 hours (b) between 750 to 900. [6]

9. Define partial and multiple correlation with suitable examples. Write down the properties of partial and multiple correlation. [5]

10. Raw material used in the production of a synthetic fiber is stored in a place which has no humidity control. Measurements of the relative humidity in the storage place and moisture content of sample of the raw material (both in percentage) on 12 days yielded the following results: [5]

Humidity, X	42	35	50	43	48	62	31	36	44	39	55	48
Moisture content, Y	12	8	14	9	11	16	7	9	12	10	13	11

Verify that it is reasonable to fit a straight line. Fit the straight by the method of least squares.

11. Describe the procedure of the test of significance for difference of two properties for large sample. [5]

12. Six sample of each of four types of cereal grain grown in a certain region were analyzed to determine thiamin content, resulting in the following data (mg/g): [5]

Wheat	5.2	4.5	6.0	6.1	6.7	5.8
Barley	6.5	8.0	6.1	7.5	5.9	5.6
Maize	5.8	4.7	6.4	4.9	6.0	5.2
Oats	8.3	6.1	7.8	7.0	5.5	7.2

Does this data suggest that at least one of the grains differ with respect to true average thiamin content? Use 0.05 level of significance.

OR

A liquid dietary product implies in its advertising that use of the product for one month results in an average weight loss of at least 3 pounds. Eight subjects use the product for one month, and the resulting weight loss data are reported below. Do the data support the claim of the producer of the dietary product with the probability of a type I error set to 0.05?

Subjects	1	2	3	4	5	6	7	8
Weight (lb)	165	201	195	198	155	143	150	187
Weight (lb)	161	195	192	193	150	141	146	183

13. From the following data can you conclude that there is association between the purchase of brand and geographical region? [5]

	Region		
	Central	Eastern	Western
Purchase brand	40	55	45
Do not purchase brand	60	45	55

Use 5% level of significance.

14. Two different areas of a city are being considered as sites for day-care centers. Of 200 households surveys in one section, the proportion in which the mother worked full-time was 0.52. in another section, 40% of 150 households surveyed had mothers at full time jobs. At 0.05 level of significance, is there a significant difference in the proportion of working mothers in the two areas of the city? [5]

P.T.O.

- [8]

15. The entrance score of three engineering institutes are as follows:

Institutes	Entrance scores								
A	740	800	830	840	860	890	830	930	1070
B	655	775	825	978	989	1025	950	980	1100
C	850	825	749	870	565	978	925	950	1000

a) Calculate mean and standard deviation for institute A, B and C
b) Which institute is good?
c) Which institute is consistent?

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108
BEX
45+1

TRIBHUVAN UNIVERSITY
23 INSTITUTE OF ENGINEERING
Examination Control Division
2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistics *(SH602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary tables are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. In two companies A and B engaged in similar type of industry, the average weekly wage and standard deviation are given below: [6]

	Company A	Company B
Average weekly wage (Rs)	460	490
Standard deviation	50	40
No. of wage earners	100	80

   i) Which company pays larger amount as weekly wags?
   ii) Which company show greater variability in the distribution weekly wages?
   iii) What is the mean and standard deviation of all the workers in two companies taken together?

2. State the law multiplication of probability. An Electronics company has an engineering position open. The Probability that an applicant is capable is 0.7. Each applicant is given written test and oral examination. A capable applicant passes with Probability 0.9 while an incapable applicant passes with Probability of 0.4. Find (a) the probability that an applicant passes the test (b) the probability that the applicant is capable given he/she passes the test. [6]

3. Define negative Binominal Distribution. If a boy is throwing stone at a target what is the probability that his 10^{th} throw is his 5^{th} hit, if the probability of hitting the target at any trial is 0.6. Also find the mean and variance of random variable. [5]

4. Define hypergeometric probability distribution with an example. Describe the conditions for the binomial approximation to hypergeometric distribution? [5]

5. Let X denote the amount of time for which a book on two hour reserve at a college library is checked out by a randomly selected student and suppose that X has density function, [5]

$$f(x) = 1/2x, \quad 0 \le x \le 2$$
$$= 0 \quad \text{otherwise}$$

   Calculate $P(X \le 1)$ and $P(0.5 \le X \le 1.5)$

6. Define continuous random variable with suitable example. Describe the properties of probability density function and distribution function. [5]

7. State Central limit theorem with an example. Explain why it is important in engineering field? [5]

8. A population consists of the four number 2,8,14,20 [5]
   i) Write down all possible sample size of two without replacement
   ii) Verify that the population mean is equal to the mean of the sample mean
   iii) Calculate the standard error of the sampling distribution of the sample mean

9. Define Karl Person coefficient of Correlation and coefficient of determination. What it is input in analysis. [5]

[5]

10. A house survey on monthly expenditure on food yield following data:

Monthly expenditure (100 Rs.)	10	15	20	25	30	35	40
Monthly income (1000 Rs.)	2	4	5	7	6	6	5
Size of the family	4	5	7	10	8	11	4

Obtain the multiple correlation coefficient.

11. There was a research on voltage supply by Ba Hries supplied by two companies. Both company claims that same. But researcher suspects that there is significance difference between mean voltages between two companies. To test this, she selected independent samples from both company and in lab test the result were as follows: [5]

		Mean	Sample Standard deviation
Company A	13	3.59V	0.3V
Company B	10	3.15V	0.4V

Test the researcher suspect was correct at 5% level of significance.

12. Shyam and Co. produces three varieties of certain product: deluxe, find and ordinary. A recent market survey is conducted for preference of products. The preference was found as follow: [5]

Product	Production			
Deluxe	15	14	19	18
Fine	17	12	20	16
Ordinary	16	18	16	17

Is there a significant difference in the preference of products test it using ANOVA test. Use $\alpha = 5\%$

OR

The following are the average weekly losses of worker hours due to accidents in 10 industrial plan before and after a certain safety program was put into operation:

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Use the 0.05 level of significance to test whether the safety program is effective.

13. Define critical value. A manufacturer claimed that at least 95% of the water pumps supplied to the ABC Company confirmed to specification. However, the product manager at ABC Company wasn't satisfied with the claim of the manufacturer. Hence, to test the claim, the manager examined a sample of 250 water pumps supplied last month and found that 228 water pumps as per the specification. Can you conclude that the production manager is right to doubt on the claim of the manufactures? (α=0.01) [5]

14. Describe the Hypothesis testing procedure of Chi-square test of independence for 2×2 table. [5]

15. The following table shows the number of hours 45 hospital patients slept following the administration of a certain anesthetic. [8]

7	10	12	4	8	7	3	8	5
12	11	3	8	1	1	13	10	4
4	5	5	8	7	7	3	2	3
8	13	1	7	17	3	4	5	5
3	1	17	10	4	7	7	11	8

a) Find sample mean, sample variance and sample standard deviation
b) Compare a value that measures the amount of variability relative to the value of mean

22 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistics *(SH602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary tables are attached herewith.*
- ✓ *Assume suitable data if necessary.*

Prashant Rasaili
070/BEX/29

1. What are the differences between measures of central tendency and measures of dispersion? The mean and standard deviation of 20 items is found to be 10 and 2 respectively. At the time of checking it was found that one item 8 was incorrect. Calculate the mean and standard deviation if: (i) the wrong item is omitted (ii) it is replaced by 12. [6]

2. Define conditional probability. An assembly plant receives its voltage regulators from these three different suppliers, 60% from supplier A, 30% from supplier B, and 10% form supplier C. It is also known that 95% of voltage regulators from A, 80% of these from B, and 65% these from C perform according to specifications. What is the probability that [6]
   i) Anyone voltage regulator received by the plant will perform according to specifications
   ii) A voltage regulator that perform according to specification came from B

3. Write the differences and similarities between Binomial and Negative Binomial Distribution. [2+3]

4. In certain factory turning out optical lenses, there is a small change, 1/500 for any lens to be defective. The lenses are supplied in packets of 10 each. What is the probability that a packet will contain [5]
   i) No defective lens
   ii) At least one defective lenses
   iii) At most two defective lenses

OR

Define mathematical expectation of a discrete random vasriable. A probability distribution is given.

X = x	0	1	2	3	4	5
p(X=x)	0.26	0.25	0.11	0.02	0.25	0.11

Find (a) $P(X \geq 4)$; (b) $p(0 < X < 4)$; (c) mean and variance of X

5. Define standard normal distribution. Give the condition for normal approximation of Poisson distribution. [5]

6. The mean inside diameter of a sample of 200 washers produced by a machine is 0.502 cm and the standard deviation as 0.005 cm. The purpose for these washers are interned allows a maximum tolerance in the diameter of 0.496 to 0.508 cm, otherwise the washers are considered defective. Determine the percentage of defective washers produced by the machine. Assume the diameter is normally distributed. [5]

7. What do you mean by sampling distribution of a sample mean and its Standard Error? Explains with example. What would be the variance of sampling distribution of mean, if sample is taken from finite population? [5]

8. Define the Central Limit Theorem. A sample of 100 mobile battery cells tested to find the length of life produced the following results as mean 13 months and standard deviation of 3 months. Assuming the data to be normally distributed by using Central Limit Theorem what percentage of battery cells expected to have Average life? [5]

i) More than 15 months (ii) Less than 9 months

9. Define partial and multiple correlations with examples. Write down the properties of partial and multiple correlation. [5]

10. An article in wear (Vol.152, 1992, pp. 171-181) presents data on the fretting wear of mild steel and oil viscosity. Representative data follow, with x = oil viscosity and y = wear volume (10^{-4} cubic millimeters). [5]

y	240	181	193	155	172	110	113	75	94
x	1.6	9.4	15.5	20.0	22.0	35.5	43.0	40.5	33.0

i) Fit the sample linear regression model using least
ii) Predict fretting wear when viscosity x = 30

11. Describe the procedure of the test of significance for difference of two population mean for large sample. [5]

12. Ten objects were chosen at random from the large population and their weights were found to be in grams 63, 63, 64, 65, 66, 69, 65, 66.1, 64.5. In the light of above data, discuss the suggestion that the mean weight in the population is 65 gm. Use $\alpha = 0.05$. [5]

13. Define chi-square distribution. From the following data can you conclude that there is association between the purchase of brand and geographical region? (Use 5% level of significance). [5]

	Region		
	Central	Eastern	Western
Purchase brand	40	55	45
Do not purchase brand	60	45	55

14. In a postal survey of 500 households, 330 said that they thought they were being overcharged for the public services within their area. [5]

i) Calculate an approximate 99% confidence interval for the population proportion, p, of households who thought they were being overcharged for public services within their area.
ii) Estimate the size of sample required to estimate the value of p to be within 99% confidence limits of ±0.025.

15. Following data gives the sample records of number of passenger take ticket at the counter of Bus during one hour period. [8]

22	58	32	36	62	57	25	45	23	37
64	56	46	60	29	49	63	36	26	58
60	26	58	58	29	43	53	36	45	22
52	43	45	31	45	39	35	38	30	60
58	42	54	62	52	42	65	58	51	60
53	45	31	53	22	53	51	52	47	59

Find the

i. Sample mean of Number of passenger
ii. Sample Standard deviation and Coefficient of variation.
iii. Standard error of the sample mean.
iv. Find the 95% and 99% confidence limit of sample mean

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22

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistic *(SH602)*

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt All questions.*
- *The figures in the margin indicate Full Marks.*
- *Necessary tables are attached herewith.*
- *Assume suitable data if necessary.*

1. What is absolute and relative Measure of Dispersion? Construct a Box plot from the following data of marks of students as: [1+5]

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	2	6	22	13	7

2. State the law of addition of probability. In a training, the 70% of persons achieved a rating of Satisfactory. Of those as rated as Satisfactory, 80% had Acceptable Scores on the personality test. Of those rated as Unsatisfactory, 35% had Acceptable Scores. Find the probability that an applicant would be a Satisfactory trainee given the Acceptable scores on personality test. [2+4]
3. Define Negative binomial distribution with its important characteristics. [5]
4. A particularly long traffic light on your morning commute is green 20% of the time that you approach it. Assume that each morning represents as independent trial. [5]
   i) Over five mornings, what is the probability that the light is green on exactly one day?
   ii) Over 20 mornings, what is the probability that the light is green on exactly four days?
5. The distribution function for a random variable X is [5]

$$F(x) = 1 - e^{-2x} \text{ for } x \geq 0$$
$$= 0 \quad \text{for } x < 0$$

   i) Find $P(X > 2)$
   ii) Find mean and variance of the variable X.
6. Define Standard Normal Distribution with their respective probability density function and describe its properties. [5]
7. An article in Wear (Vol.152, 1992, pp.171-181) presents data on the fretting wear of mild steel and oil viscosity. Representative data follow, with x = oil viscosity and y = wear volume (10^{-4} cubic millimeters). [5]

y	240	181	193	155	172	110	113	75	94
x	1.6	9.4	15.5	20.0	22.0	35.5	43.0	40.5	33.0

   i) Fit the simple linear regression model using least
   ii) Predict fretting wear when viscosity x = 30
8. What are the two regression coefficients and what do they represent? Write the properties of regression coefficient. [5]
9. Define Central Limit Theorem. An electronics company manufactures resistors that have a mean resistance of 100 ohms and a standard deviation of 10 ohms. The distribution of resistance is normal. Find the probability that a random sample of 25 resistors will have an average resistance less than 98 ohms. [5]

10. Define standard error of sample mean. A population consist of the four numbers 12, 19, 13, 16. [5]

i) Write down all possible sample size of two without replacement.
ii) Find standard error of the sample mean.

11. Describe the procedure of the test of significance for difference of two population mean for large sample. [5]

12. In the investigation of a citizens' committee complaint about the availability of fire protection within the country, the distance in miles to the nearest fire station was measured for each of five randomly selected residences in each of four areas. [5]

Area 1	7	5	5	6	8
Area 2	1	4	3	4	5
Area 3	7	9	8	7	8
Area 4	4	6	3	7	5

Do these data provide sufficient evidence to indicate a difference in mean distance for the four areas at the = 0.05 level of significance?

OR

The diameter of steel rods manufactured on two different extrusion machines is being investigated. Two random samples of sizes $n_1 = 15$ and $n_2 = 17$ are selected, and the sample means and sample variances are $\bar{x}_1 = 8.73, s_1^2 = 0.35, \bar{x}_2 = 8.68$, and $s_2^2 = 0.40$, respectively. Assume that $\sigma_1^2 = \sigma_2^2$, and that the data are drawn from a normal distribution. Is there evidence to support the claim that the two machines produce rods with different mean diameters? Use $\alpha = 0.05$ in arriving at this conclusion.

13. A random sample of 500 adult residents of Maricopa County found that 385 were in favor of increasing the highway speed limit to 75 mph, while another sample of 400 adult residents of Pima County found that 267 were in favor of the increased speed limit. Construct 95% confidence interval on the difference in the two proportions. [5]

14. Define chi-square distribution. From the following data can you conclude that there is association between the purchase of brand and geographical region? [5]

	Region		
	Central	Eastern	Western
Purchase brand	40	55	45
Do not purchase brand	60	45	55

Use 5% level of significance.

15. The following table shows the number of hours 45 hospital patients slept following the administration of a certain anesthetic. [8]

7	10	12	4	8	7	3	8	5
12	11	3	8	1	1	13	10	4
4	5	5	8	7	7	3	2	3
8	13	1	7	17	3	4	5	5
3	1	17	10	4	7	7	11	8

i) Find sample mean, sample variance and sample standard deviation.
ii) Compute a value that measures the amount of variability relative to the value of mean.

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TRIBHUVAN UNIVERSITY
22 INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistic *(SH602)*

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt All questions.*
- *The figures in the margin indicate Full Marks.*
- *Necessary tables are attached herewith.*
- *Assume suitable data if necessary.*

1. Two different sections of a statistics class take the same quiz and the scores are recorded below: [6]

a) Find the range and standard deviation for each section
b) What do the range values lead you to conclude about the variation in the two sections?
c) Why is the range misleading in this case?
d) What do the standard deviation values lead you to conclude about the variation in two sections?

Section 1	1	20	20	20	20	20	20	20	20	20	20
Section 2	2	3	4	5	6	14	15	16	17	18	19

2. Define dependent and independent events with suitable examples. The independent probabilities that the three sections of a costing department will encounter a computer error are 0.2, 0.3 and 0.1 per week respectively. What is the probability that there would be: [6]

i) At least one computer error per week
ii) One and only one computer error per week

3. Write the differences and similarities between Binominal and Negative Binominal Distribution. [2+3]

4. A quality control engineer inspects a random sample of 4 batteries from each lot of 24 car batteries that is ready to shipment. If such a lot contain six batteries with slight defects. What are the probabilities that the inspector's sample will contain: [5]

i) None of the batteries with defect?
ii) At least two of the batteries with defects?
iii) At most three of the batteries with defect?

5. A random variable X has the following probability density function as: [5]

$$f(x)=\begin{cases} kx^3(4-x)^2, 0<x<1 \\ 0, \text{otherwise} \end{cases}$$

Find the value of k, using this value of k find mean and variance of distribution.

6. The breakdown voltage X of a randomly chosen diode of a particular type is known to be normally distributed with mean 40 volts and variance 2.25 volts. What is the probability that the breakdown voltage will be: [5]

i) Between 39 and 42 volts
ii) Less than 44 volts
iii) More than 43 volts

OR

The daily consumption of electric power in a certain city follow a gamma distribution with $\alpha = 2$ and $\beta = 3$. If the power plant of this city has daily capacity of 12 million kilowatt hours, what is the probability that this power supply will be inadequate on any given day?

7. State central limit theorem. An electrical firm manufactures light bulbs that have a length of life that is approximately normally distributed with mean equal to 800 hours and standard deviation of 4 hours. Find the probability that a random sample of 16 bulbs will have an average life of less than 12775 hours. [5]

8. What do you mean by sampling distribution of a sample mean and its standard Error? What would be the variance of sampling distribution of mean if sample is taken from finite population? [3+1]

9. Define partial and multiple correlation with suitable examples. Write down the properties of partial and multiple correlation. [5]

10. The following data gives the number of twists required to break a certain kind of forged alloy bar and percentage of alloying element A present in the metal. [5]

Number of twists	41	49	69	65	40	50	58	57	31	36
Percentage of element A	10	12	14	15	13	12	13	14	13	12

i) Fit the regression equation of number of twists on percentage of element A. Determine the predicted number of twists required to break an alloy when percentage of element is 20.

ii) Find 99% confidence interval for the regression coefficient (i.e.slope)

11. In a certain factory, there are two independent processes manufacturing the same item. The average weight in a sample of 250 items produced from one process is found to be 120 gram with a standard deviation of 12 gram, while the corresponding figures in a sample of 400 items from the other process are 124 and 14 respectively. Test whether the two mean weights differ significantly or not at 5 percent level of significance. [5]

12. Three trained operators work on production of new product. The productivity of the operators are recorded as below: [5]

Operators	Production			
1	10	12	14	16
2	12	11	13	16
3	14	15	12	11

Using ANOVA test whether the difference in average productivity due to the difference in operators are significant. Use $\alpha = 5\%$

OR

Define confidence level and significance level. A company claims that its light bulbs are superior to those of its main competitor. If a study showed that a sample of 40 of its bulbs has mean lifetime of 647 hours of continuous use with standard deviation of 27 hour. While a sample of 40 bulbs made by its main competitor had mean lifetime of 638 hours of continuous use with standard deviation of 31 hours. Does this substantiate claim at 1% level of significance?

13. Write down the steps for testing hypothesis on difference between two population proportions for the large sample size. [5]

14. 1072 students were classified according to their intelligence and economic conditions. Test whether there is any association between intelligence and economic condition. [6]

Economic Condition	Intelligence			
	Excellent	Good	Mediocre	Dull
Good	48	199	181	82
Not good	81	185	190	106

23 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agi.	Pass Marks	32
Year / Part	III / I	Time	3 hr

Subject: -Probability and Statistics *(SH602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary tables are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. Write difference between measure of central tendency and measure of dispersion and their importance. The following table represents the marks of 100 students. [6]

Marks	0-20	20-40	40-60	60-80	80-100
No. of Students	14	?	27	?	15

If the mode value is 58, find the missing frequencies and the mean of all 100 students.

2. Define multiplication law of probability for dependent and independent events with suitable examples. The independent probabilities that the three sections of a costing department will encounter a computer error 0.2, 0.3 and 0.1 per week respectively. What is the probability that there would be: [6]
   i) At least one computer error per week?
   ii) One and only one computer error per week?
3. Define Negative binomial distribution with an example. How does the negative binomial distribution differ from binomial distribution? [2+3]
4. A heavy machinery manufacturer has 3840 large generators in the field that are under warranty. If the probability is 1/1200 that any one will fail during the given year, find the probability: [5]
   i) That exactly 3 generators will fail during the given year?
   ii) That between 2 and 6 are fail during the given year?
5. Define the standard normal distribution. Give the condition for normal approximation of Poisson distribution. [2+3]
6. The breakdown voltage X of a randomly chosen diode of a particular type is known to be normally distributed with mean 40 volts and variance 2.25 volts. What is the probability that the breakdown voltage will be: [5]
   i) Between 39 and 42 volts
   ii) Between 40 and 43 volts
   iii) Less than 44 volts

OR

A probability density function is given by $f(x)=Ax\,(6-x)^2$ for $0 < x < 6$
   i) Find the value of A
   ii) Find the mean and variance of this distribution
7. Define sampling distribution of proportion with example. [4]
8. The monthly income of a particular group of retailer's follows a normal distribution with mean Rs.21,000.00 and standard deviation of Rs.9,487.00. A random sample of size 10 retailers was taken and the mean income is calculated. Find the probability that this sample lies between Rs.18,000.00 and Rs.27,000.00. [6]
9. Define partial correlation and multiple correlations with suitable examples. Write down properties of partial and multiple correlations. [5]
10. The following data gives the number of twists required to break a certain kind of forced alloy bar and percentage of alloying element A present in the metal. [5]

Number of twists	41	49	69	65	40	50	58	57	31	36
Percentage of element A	10	12	14	15	13	12	13	14	13	12

   i) Fit the regression equation of number of twists on percentage of element A. Determine the predicted number of twist required to break an alloy when percentage of element is 20.

11. The mean weight loss of n = 16 grinding balls after a certain length of time in mill slurry is 3.42 grams with a standard deviation of 0.68 gram. Construct a 99% confidence interval for the true mean weight loss of such grinding balls under the stated conditions. [4]

12. Four trained operators works on production of new product. The productivity of the operators are recorded as below: [6]

Operators	Production			
1	10	12	14	16
2	12	11	13	16
3	14	15	12	11
4	16	10	17	17

Using ANOVA, test whether the difference in average productivity due to the difference in operators are significant. Use $\alpha = 5\%$

OR

The following are the average weekly losses of worker hours due to accidents in 10 industrial plants before and after a certain safety program was put into operation:

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Use the 0.05 level of significance to test whether the safety program is effective.

13. Define confidence level and significance level. A manufacturer claimed that at least 95% of the cables supplied to the ABC Company confirmed to specifications. However, the production manager at ABC Company wasn't satisfied with the claim of the manufacturer. Hence, to test the claim, the manager examined a sample of 250 cables supplied last month and found that 228 cables as per the specifications. Can you conclude that the production manager is right to doubt on the claim of the manufacturer? (α=0.01) [5]

14. Define chi-square distribution. A book containing 500 pages was thoroughly checked. The distribution of number of error page was given below as: [5]

Number of errors	0	1	2	3	4	5
Number of pages	275	138	75	7	4	1

Using chi-square test of goodness of fit, verify whether the arrivals follow a Poisson distribution at 5% level of significance.

15. The sample of length of life of bulbs from two companies are given below: [8]

Length of Life (hours)	Company	
	A	B
500-600	10	3
600-700	21	8
700-800	6	15
800-900	8	12
900-1000	21	4
1000-1100	10	5
1100-1200	2	15
1200-1300	12	13
1300-1400	19	7
1400-1500	9	7
1500-1600	3	4
1600-1700	7	6
1700-1800	5	3
1800-1900	4	2
1900-2000	1	3

i) Calculate mean length of life of bulbs for Company A and Company B.
ii) Calculate sample standard deviation and sample variance for given data.
iii) Which Company's bulbs are more uniform?

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23

TRIBHUVAN UNIVERSITY

INSTITUTE OF ENGINEERING

Examination Control Division

2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Probability and Statistics *(SH602)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt __All__ questions.*
- ✓ *The figures in the margin indicate __Full Marks__.*
- ✓ *__Necessary tables are attached herewith.__*
- ✓ *Assume suitable data if necessary.*

1. In statistics paper five candidates obtain the marks as 33, 38, 48, 59 and 72. Calculate the mean and standard deviation of these marks. If 10 marks are added for each student, what will be mean and standard deviation? [3+3]

2. Distinguish between mutually exclusive and equally likely events with examples. What is the use of Bayes theorem in theory of probability? In a college 45% students belong to Civil, 30% Electronics and remaining to other faculties. The probability of being top is 5%, 4% and 2% respectively in civil, electronics and others. If this year's result is published, what is the probability that the topper is form electronics? [6]

3. Define poisson probability Distribution. Write the conditions for poisson approximation to Binomial Distribution. [2+3]

4. A quality control engineers inspects a random sample of 3 batteries from each lot of 24 car batteries that is ready to shipment. If such a lot contain six batteries with slight-defects, what is the probabilities that the inspector's sample will contain. [5]
   i) None of the batteries with defect?
   ii) Only one of the batteries with defect?
   iii) At least two of the batteries with defect?

5. Define standard normal distribution with area property. [6]

6. The marks obtained by IOE students in statistics are 50 on average with variance 16. If 5000 students have given the exam, find the following: [4]
   a) The number of students securing marks less than 40?
   b) The number of students securing marks between 35 to 60?

   OR

   Let X denotes the amount of time for which a book on two-hour reserve at a college library is checked out by a randomly selected students, and suppose that X has density function $f(x) = kx, 0 \le x \le 2$

   0, otherwise

   a) Find the value of k
   b) Calculate $P(X \le 1)$
   c) Calculate $P(0.5 \le X \le 1.5)$
   d) Calculate $P(1.5 < X)$

7. Define sampling distribution of mean. [4]

8. Define Central Limit Theorem. In a sample of 16 observations from a normal distribution with mean of 150 and a variance of 256, what is (a) $P(\bar{x} < 160)$ (b) $P(\bar{x} > 142)$ [2+4]

9. What is the difference between correlation and regression? Plot the sample regression line of Y on X. [2+4]

Speed x	30	40	50	60	70
Stopping distance y	160	240	330	435	500

9. Define partial correlation and multiple correlations with suitable examples. Write two properties of each. [6]

10. Observation on the yield of a chemical reaction taken at various temperatures was recorded as follows: [4]

X (°C)	150	150	200	250	250	300	150
Y%	75.4	81.2	85.5	89	90.5	96.7	75.4

Fit a simple linear regression and estimate value of yield at 200°C.

11. An analysis for pH (acidity) in an random sample of water from 40 rainfalls showed that mean is 6.7 and s.d. is 0.5. Find a 99% confidence interval for the mean pH in rainfalls. [4]

12. As a part of investigation of the collapse of the roof of a building, a testing laboratory is given all the available bolts that connected the steel structure at three different positions on the roof. The forces required to shear each of these bolts (coded values) are as follows: [6]

Position 1	90, 82, 79, 98, 83, 91
Position 2	105, 89, 93, 104, 89, 95, 86
Position 3	83, 89, 80, 94

Perform an ANOVA to test at the 0.05 level of significance whether the difference among the sample means at the three positions are significant.

OR

The following are the average weekly losses of worker-hours due to accidents in 10 industrial plants before and after a certain safety program was put into operation:

45 and 36, 73 and 60, 46 and 44, 124 and 119, 33 and 35, 57 and 51, 83 and 77, 34 and 29, 26 and 24, 17 and 11. Use the 0.05 level of significance to test whether the safety program is effective.

13. The results of polls conducted two weeks and four weeks before an election are shown in the following table: [5]

	Two weeks before election	Four weeks before election
For republican candidate	79	91
For democratic candidate	84	66
Undecided	37	43

Use the 0.05 level of significance to test whether there has been change in opinion during the 2 weeks between the polls.

14. A manufacturer of submersible pumps claims that at most 30% of the pumps require within the first 5 years of operation. If a random sample of 120 of these pumps includes 47 which required repairs within the first 5 years, test the null hypothesis $p = 0.30$ against the alternative hypothesis $P > 0.30$ at the 0.05 level of significance. [5]

15. The following data are the ages (in months) at which $n = 50$ children were first enrolled in a preschool. [8]

38	40	30	35	39
47	35	34	43	41
32	34	41	30	46
55	39	33	32	32
42	50	37	39	33
40	48	36	31	36
36	41	43	48	40
35	40	30	46	37
45	42	41	36	50
45	38	46	36	31

a) Find sample mean, sample variance and sample standard deviation

b) Compute a value that measures the amount of variability relative to the value of mean

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27 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Communication English *(SH601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

FSU 2073

1. Edit the following text. [5]

Some argue that american politics has become so polarized that politicians will argue merly to gain power, and the subject to debate is often negligible. The vigorous dispute over where to place a comma in the republican platform for example was motivated not by any significance change of meaning but a desire not to show any deference of the other side.

2. Read the given text and interpret its meaning. [5]

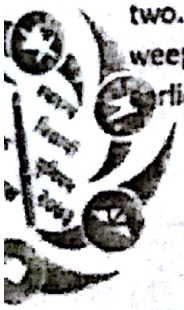
The survival of the publishing industry depends upon the existence of a public who will buy the printed word in the form of newspapers, books and magazines. Over the past several years, however, the advance of electronic media, particularly CD-ROMs, online computer services, and the Internet, has made information available to the public electronically without the need for printed materials. As the availability of electronic media increases and as it is more easily accessible, the public has less need for printed materials.

3. Read the following passage carefully, make notes and write a summary of it. [5+5]

According to usage and conventions which are at last being questioned but have by no means been overcome, the social presence of a woman is different in kind from that of a man. A man's presence is dependent upon the promise of power which he embodies. If the promise is large and credible, his presence is striking. If it is small or incredible, he is found to have little presence. The promised power may be moral, physical, temperamental, economic, social, and sexual—but its object is always exterior to the man. A man's presence suggests what he is capable of doing to you or for you. His presence may be fabricated, in the sense that he pretends to be capable of what he is not. But the pretence is always toward a power which he exercises on others.

By contrast, a woman's presence expresses her own attitude to herself, and defines what can and cannot be done to her. Her presence is manifest in her gestures, voices, opinions, expressions, clothes, chosen surroundings, taste—indeed there is nothing she can do which does not contribute to her presence. Presence for a woman is so intrinsic to her person that men tend to think of it as an almost physical emanation, a kind of heat or smell or aura.

To be born a woman has been to be born, within an allotted and confined space, into the keeping of men. The social presence of women has developed as a result of their ingenuity in living under such tutelage within such a limited space. But this has been at the cost of a woman's self being split into two. A woman must continually watch herself. Whilst she is walking across a room or whilst she is weeping at the death of her father, she can scarcely avoid envisaging herself walking or weeping. From earliest childhood she has been taught and persuaded to survey herself continually.



P.T.O.

4. Answer any TWO of the following questions: [5x2]

a) What elements of science can the ordinary citizen use in order to help his society develop? (The Scientific Attitude)

b) Write the character of Dmitri Dmitritch Gurov in about 150 words. (The Lady with the Pet Dog)

c) Russell says 'with the increase of knowledge and skill, wisdom becomes more necessary'. Do you agree with him? Give your opinions. (Knowledge and Wisdom)

5. Choose the best answer: [0.5x10]

a) You, he and I _____ neighbours. (am, are)

b) The team _____ struggling for its victory. (is, are)

c) It is me who always _____ right decision. (take, takes)

d) He _____ as if he were illiterate. (talks, talked)

e) Had she reached airport in time, she _____ her flight. (wouldn't miss, wouldn't have missed)

f) If you buy this car, you _____ Rs. 25,00000/- only. (will have to pay, have to pay)

g) There's no one here I can confide _____ (in, on)

h) The king bestowed an honour _____ her. (to, upon)

i) The passive voice of "His conduct shocked me" is _____. (I was shocked by his conduct / I was shocked at his conduct)

j) The passive voice of "He urged the council to reduce the rates" is _____. (He urged that the rates should be reduced / He urged the rates to be reduced)

6. Change the following citations as indicated in brackets: [4]

a) Lyons, J. Language and Linguistics. USA: CUP, 2003. (into APA)

b) Imam, S.T. Brush UP Your English. India: Bharati Bhavan, 2003. (into APA)

c) Hall, Dauglas. (1989). Digital circuits and systems. New York: Macmillan. (into MLA)

d) Wolf, Daniel. (1995). Lives of notable gay men and lesbians. New York: Chelsea Publishing. (into MLA)

7. Suppose you are the newly appointed chairperson of the committee of the 14th National Technological Festival 2017. In order to make the festival highly effective and successful, you want to discuss some matters with other members of the committee. Now write a notice along with four-point agenda for the first meeting of the committee: [5]

8. Suppose you are senior engineer working on Electoral Supply Project, Kathmandu, Nepal. Write its first yearly progress report that you are going to submit to the project manager. Prepare it in letter format. [6]

9. Assume that as a Project Development Officer you have been asked by the National Institute of Computer Education, Kathmandu, to set up a Communication Technology Centre at Dhobighat, Kathmandu for training professionals in the use of latest technological aids for face-to-face and distance communication. Write a technical proposal to be submitted to the Director of the Institute. Prepare only title page, technical section and cost estimate of your proposal. [10]

10. There has been minimum rainfall in winter in Kathmandu this year. Write a report on the problems caused by it to the Kathmanduits. Prepare an outline of your report and then write cover page, abstract and introduction in detail. [10]

11. Write, in about 500 words, a research article on "Significance of power-point presentation in technical communication". [10]

xxx

27 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Communication English *(SH601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Edit the following text: [5]

But the Bengali lady with green who kept darting looks at the drummer rather than on the beautiful sitar player whispered suddenly he keeps staring at me Minakshi. Or, perhaps it is I who keep staring at him. I cant take my eyes off him Minakshi.

2. Give the interpretation of the following text: [5]

It is not only in public ways, but in private life equally, that wisdom is needed. It is needed in the choice of ends to be pursued and in emancipation from personal prejudice. Even an end which it would be noble to pursue if it were attainable may be pursued unwisely if it is inherently impossible of achievement. Many men in past ages devoted their lives to a search for the philosopher's stone and the elixir of life. No doubt, if they could have found them, they would have conferred great benefits upon mankind, but as it was, their lives were wasted.

I think the essence of wisdom is emancipation, as far as possible, from the tyranny of the here and the now. We cannot help the egoism of our senses. Sight and sound and touch are bound up with our own bodies and cannot be made impersonal. Our emotions start similarly from ourselves. An infant feels hunger or discomfort, and is unaffected except by his own physical condition. Gradually with the years his horizon widens and in a proportion as his thoughts and feelings become less personal and less concerned with his own physical states, he achieves growing wisdom. This is of course a matter of degree. No one can view the world with complete impartiality; and if anyone could, he would hardly be able to remain alive. But, it is possible to make a continual approach towards impartiality, on the one hand, by knowing things somewhat remote in time or space and, on the other hand, by giving to such things their due weight in our feelings. It is this approach towards impartiality that constitutes growth in wisdom.

Can wisdom in this sense be taught? And, if it can, should the teaching of it be one of the aims of education? I should answer both these question in the affirmative.

3. Read the following passage carefully, make notes and write a summary of it. [5+5]

A recent investigation by scientists at the U.S. Geological Survey shows that strange animal behaviour might help predict earthquakes. Investigators found such occurrences within a ten-kilometre radius of the epicentre of a fairly recent quake. Some birds screeched and flew about wildly; dogs yelped and ran around uncontrollably.

Scientists believe that animals can perceive environmental changes several hours or even days before the mishap. Animals were noted as being restless for several weeks before a Tashkent, Uzbekistan, earthquake. An hour before the disaster, domestic animals refused to go indoors, and dogs howled and barked furiously. In 1960, an earthquake struck Agadir in Morocco. Survivors recall that stray animals, including dogs, were seen streaming out of town before the earthquake. In a safari zoo near San Francisco, llamas would not eat the evening before a 1979 quake, and they ran around wildly all night.

Unusual animal behaviour preceding earthquakes has been noted for centuries. British Admiral Robert Fitzroy reported huge flocks of screaming seabirds over Concepcion, Chile, in 1835. An hour and a half later, dogs were seen fleeing, and ten minutes later the town was destroyed. Similar stories of chickens running around in apparent states of panic, horses trembling, and dogs barking incessantly were recorded throughout the eighteenth and nineteenth centuries by survivors of earthquake destruction in India, Yugoslavia, Peru, Mexico, and the United States.

In 1976, after monitoring bizarre animal behaviour, the Chinese predicted a devastating earthquake. Although hundreds of thousands of people were killed, the government was able to evacuate millions of other people and thus keep the death toll at a lower level.

4. Answer any TWO of the following question: [2×5]

a. 'Is it she?' 'It is she?' What does this exchange tell us about what the people thought of her? What did they do when they saw her? Why? (The Mother of a Traitor)

b. What are the two ways in which science can help society to develop? (The Scientific Attitude)

c. What is chain reaction? Describe it in brief. (Chain Reaction)

5. Choose the best answer: [0.5×10]

a. Should you do it, I .....happy. (will be, would be)
b. If she ..... you, she would write an application. (was, were)
c. He hates parting .....his money. (with, from)
d. The firm have provided me .....a car. (with, no preposition)
e. The Passive Voice of 'Hear him now' is ..... (Let him be heard now/He should be heard now)
f. The Active Voice of 'Who was helped by whom?' is .....? (Who did help whom/Who helped whom)
g. More than one student ..... playing. (is, are)
h. The Prime Minister and Chancellor ..... coming. (is, are)
i. It's time you ..... those trousers. (wash, washed)
j. I wish I ..... meet her. (should, would)

6. Put the following information in to APA and MLA styles of citation. [4]

   a) Book Name = The ACS style Guide: A manual for Authors and Editors

      Author's name = Janet S. Dodd

      Publishers = American Chemical Society

      Place of Publication = Washington, DC

      Year of Publication = 1986

   b) Journal = Computer Publishing

      Author = Jan V. White

      Article = Colour in Context

      Date of Publication = February, 1991

      Page nos = 55-57

7. Suppose you are the secretary of Sony Electronics Private Limited, Baluwatar, Kathmandu and the 7th meeting regarding the problems of the staff of the limited has been held recently. Inventing the most relevant agenda, write minutes of the same. [5]

8. As a chief contractor of an affordable, earthquake resistant housing project, write the second quarterly progress report in memo format, invent necessary details. [6]

9. Write in about 500 words, a research articles on "Development of Information Technology in Nepal". [10]

10. Design the title page and write the Abstract, Table-of-Contents and Recommendation for the proposal titled "Building of an Auditorium" in your campus. [10]

OR

"Formation of A Student Project Club".

11. Imagine that you have already prepared a report on "Environmental Pollutions in Asia". Show the Title page, Abstract, Introduction and Recommendation sections of your report. [10]

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21 TRIBHUVAN UNIVERSITY 418
INSTITUTE OF ENGINEERING
Examination Control Division

2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Communication English *(SH601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Edit the following text: [5]

Arundhati Roy the famous novelist and activist who won the booker prize in 1997 for her novel. The God of small things was born in shellong Meghalaya on november 24, 1961 to a Keralite mother and a Bengali father.

In 1984 Arundati began a brief career in films. She played the role of a village girl in the moule massey sahib and also wrote the screen play for the film in which Annie gives in those ones.

Roy began writing the god of small thengs in 1992 and finished it in 1996.

2. Read the following text carefully and interpret it so as to make the meaning clear. [5]

Ever since humans have inhabited the earth, they have made use of various forms of communication. Generally, this expression of thoughts and feelings has been in the form of oral speech. When there is a language barrier, communication is accomplished through sign language in which motions stand for letters, words, and ideas. Tourists, the deaf, and the mute have had to resort to this form of expression. Many of these symbols of whole words are very picturesque and exact and can be used internationally; spelling, however, cannot.

3. Read the following passage carefully and (i) make notes and (ii) write summary. [5+5]

To solve the most urgent health problems of developing countries, expert have recommended that priority should be given to primary health care. This approach to health care, as we have seen, emphasizes health maintenance through disease prevention and control. Many of the developing world's deadliest disease The experts point out; can be prevented if clean water and adequate sanitation are provided. Other disease can be prevented by mass vaccination programs. Still other can be controlled by effective health education that gives people information about ways to avoid malaria-carrying mosquitoes or about the importance of nutrition, especially for pregnant women and young children.

Primary heath care, as we have seen, does not merely focus on prevention and ignore the treatment of disease. Another priority for poorer nations is to provide timely diagnose and basic treatment for the general populations instead of technologically advanced and expensive treatment for a few wealthy people. Under international program, the governments of developing countries are given incentives to build community health centers and train health workers. Patients receive immediate attention from doctors, nurses and health workers who have to the necessary diagnostic training and equipment and have an adequate supply of drugs. These local health centers are much more accessible to people who need treatment than a few hospitals in the larger cities.

If poorer countries can offer this type of health care, the health of their general populations will improve rapidly. A number of developing countries have already shown that primary health care programs can be successful. Cuba eliminated polio in 1972, even before the disease was eliminated in the United States. In 1974, the World Health Organization began a program to immunize the world's children against six vaccine-preventable diseases during their first year of life. By 1994, the vaccinations were protecting 80 percent of children and the annual number of child deaths had fallen by 3 million. Another WHO program, whose goal was to wipe out polio in the Americas, began in 1985. The goal was achieved in 1991. In the year, nearly 2 million children in Peru were vaccinated in one week after polio had been diagnosed in a two-year-old boy. The boy, Luis Fermin, recovered and proved to be the last case of polio in the Americas.

4. Answer any two: [5×2]

i) What was the mother's delemma and how did she solve it? (The mother of A Traitor by maxim Gorku)
ii) What do you mean by a sense of proportion? (Knowledge and Wisdom)
iii) Describe the contribution of Einstein to the world? (What Einstein did?)

5. Choose the correct words from the bracket: [0.5×10]

i) Neither he nor his relative ..... turned up. (has, have)
ii) Either sugar or tea ..... suitable for the drink. (is, are)
iii) He asked me what I ..... do for a living. (will, should)
iv) She has a taste ..... music (of, for)
v) He was told not to worry ..... the matter. (with, about)
vi) It is no use ..... to come now. He is very busy. (to ask him, if you asked him)
vii) He was an ..... scientist. (remiment, imminent)
viii) A fool's paradise mean ..... (to have happy dreams, live in illusions)
ix) She yelled ..... him. (to, at)
x) The news ..... false. (is, are)

6. Write the following bibliographic references first in MLA and then in APA. [4]

Name of the book: The Remains of the Day
Name of the publisher: Faber
Place of publication: London
Year of publication: 1989
Name of the author: Kazuo Ishiguro

7. As the C.R (class representive) of your class, write the Notice, Agenda and Minutes of the meeting: "Farewell programme for the seniors". [5]

8. Suppose you have been working on a project of your engineering field for a few months. Write the second monthly progress report of the work you have completed in letter format. [6]

9. Write a brief research article on reducing Air Pollution in the Kathmandu Valley. [10]

10. Suppose that you are interested in establishing a new software company in Kathmandu. Write title page, introduction and technical section of your proposal that you are going to submit to the Ministry of Science and Technology, Singh durbar, Kathmandu. [10]

11. Write a report on "Development of communication system" in remote areas of Nepal. Invent necessary details. [10]

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ENGINEERING
Examination Control Division

2071 Chaitra

Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B. Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Regular

Subject: - Communication English *(SH601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Edit the following: [5]

Two pastors are standing by the side of a road holding up a sign that reads. The end is near turn around now before its too late! A passing driver yells, "you guys are nuts!" and speed past them. From around the curve, they hear screeching tyres- then a big splash. One of the pastors says to the other, do you think we should just put up a sign that says Bridge broken instead?

2. Study the following paragraph carefully and interpret it in your own words: [5]

The prevention of free inquiry is unavoidable so long as the purpose of education is to produce belief rather than thought to compel the young to hold positive opinions on doubtful matters rather than to let them see the doubtfulness and be encouraged to independance of mind. Education ought to foster the wish for truth, not the conviction that some particular creed is the truth.

3. Study the following text carefully, prepare notes and convert it into summary: [5+5]

One day in 2003, while on her morning walk in the park, Valavolkar felt a shape pain in her left shoulder. The pain soon subsided and she decided to go about her chores.

But a few hours later, the waves of pain returned when she was out walking again, this time to see the neighbourhood dentist about a cavity. It was much than in the worse morning. Overwhelmed with nausea, dizziness and shoulder pain that grew more intense with every step she took, she felt too weak to move. Anyhow, her husband and son being away at work, she assumed it was spondy litis and got in touch with a family friend, an orthopedic doctor, who insisted she see a heart specialist immediately.

At workhardt hospital soon afterwards, it became clear to the medics that she was having a myocardial infaretion, a heart attack caused by the blockages- in Valavalkar's case of three blood vessels to the heart. One of them, a key artery, had a 95 percent blockage. An angioplasty was performed and a stent inserted to open up the blockage. Her medical care had been so swift, however, that there was no serious damage to the heart muscle.

Since then she hadn't been without trouble, but a cardiac rehab programe she entered in 2006 has helped her lead a normal life. "I feel fine now," Valvakar says, looking back. "Periodic check ups are essential and fortunately for me, these have revealed no problems. I am very active now. I even counsel other heart patients to help them stay positive."

"Women have different risk factors for cardiac disease than men, but there is such little awareness, " says Dr.Vanita Arora cardiae electrophysiologist and associate director at the Max Health Care Superspeciality Hospital in New Delhi.

4. Answer any two of the following questions: [5+5]

a) Point out weaknesses of steam boilers and suggest any other better option of source of energy in context of Nepal. Tell why you think that could be the better option. (Steam Boilers)

b) In recent years we Nepalese have seen colorful advertisements in newspapers about multi-storeyed apartments from different housing companies. In relation to this, talk about the suitability of the text "Piles for Foundations."

c) Describe the various features that contribute to wisdom with reference to the text "Knowledge and Wisdom".

5. Fill up the following blank spaces selecting the correct words from the brackets: [0.5×10]

a. He, along with his teachers, ...playing. (is, are)

b. The principal and accountant.....on leave. (is, are)

c. It .....a long time since he telephoned me. (is, has been)

d. It's high time he .....the job. (got, has got)

e. Had it not been a hot day, we .....a lot. (had worked, would have worked)

f. Should that happen, I .....the job. (should quit, will quit)

g. I'll stand .....you whatever happens. (for, by)

h. The project is running .....financial difficulties. (with, into)

i. The passive voice of "I remember him teaching me algebra" is ..... (I remember being taught algebra/I remember to being taught algebra by him.)

j. The passive voice of "I saw him crossing the road" is ..... (He was seen crossing the road by me/He was seen to be crossing the road.)

6. Convert the following APA style into MLA and MLA into APA: [4]

a) Santos, Richard. "Tax break?" The New Republic. 12 July. 1998: 24-40
b) Scotto, P.Censorship, Reading and Interpretation. (2011) Studies in American Obfuscation 61-70.
c) Fetler, Jane. "Critical People Cause Office Fireworks" (2010, June 4). The Providence Journal, P.A1.
d) Prepare in text citation for:
Wang, P. (1999, July) Fund Watch. Money, PP.49-54.

7. Assume that you have been appointed secretary of a committee comprising management, staff and workers representatives to advise the company to produce a handbook containing information about conditions of service, rules and regulations of fringe benefits and other related matters. Write a notice to call a meeting to discuss above matters. [5]

8. Suppose you are the chief consultant of Road Expansion Project being launched in the capital city Kathmandu. Write the second quarterly progress report in memo style. [6]

9. Write a brief research article on advancements made in the last decade in your field of engineering. [10]

10. Most communities do not have a place for scientists and citizens to meet to discuss important issues. You have a way to meet the needs of citizens who lack access to scientific expertise by bringing together scientists and non scientists to identify, discuss and resolve issues of public concern. Therefore as a matchmaker for groups and resources write a proposal. Include an introduction stating the problem and its significance. Discuss the proposed outcome and include a time table. [10]

11. Imagine that Government of Nepal has formed a committee under your chairmanship for the purpose of studying the effect of noise pollution in the industrialized towns in Nepal. Prepare only the title page, abstract, table of contents and recommendations sections of the report that you are going to submit shortly. [10]

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21 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Communication English (SH601)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data.if necessary.*

1. Edit the following text to make it error free: [5]

A woman husband had been seriously ill but finally the doctor announces that he would live. What do you mean? You told me that he couldn't last another two weeks, complained the wife. "Well, I'm going to cure him after all. Surely you're glad aren't you" replied the doctor. It puts me in kind of a trouble said the woman I've gone and sold his clothes to pay for the funeral.

2. Read the following text and interpret its meaning in your own language: [5]

Now mark another big difference between then natural slavery of man to nature and the unnatural slavery of man to man. Nature is kind to her slaves if she forces you to eat and drink, she makes eating and drinking so pleasant that when we can affect it we eat and drink too much. We must sleep or go mad; but then sleep is so pleasant that we have great difficulty in getting up in the morning.

3. Read the following text carefully, make notes and write a summary. [5+5]

Colonising space could be much more difficult than we imagine. Scientific studies suggest that children born in space might suffer permanent nervous-system damage unless exposed to Earth-like gravity at key points in their development. One difficulty could be learning how to walk. Young children born in space could have trouble walking on Earth because their nervous systems would have developed in the low-gravity environment of space. Even adults might have difficulty fully re-adjusting to life Earth after prolonged periods of weightlessness.

Scientists are just beginning to discover the importance of gravity in the development of life. They are already aware that it has a serious effect on cell metabolism, brain development and DNA synthesis. For this reason pregnant women cannot go into space. Studies of 18 pregnant mice launched into space carrying some 200 foetuses at varying stages of which is a normal aspect of development, slowed down in space, as did cell reproduction. Without gravity the space-grown brains were smaller and had fewer nerve cells than normal mouse brains. How this would affect the functioning of the brain in an adult animal requires further study.

Another effect could be muscle wasting. This has already been observed in astronauts, although there is disagreement as to whether it is linked to the effects of gravity on the muscle cells or just the lack of muscle use. In any case, loss of muscle strength in space has so far proven to be temporary and there are no confirmed reports of any long-term illness in people returning from long periods in space.

Other studies have produced mixed findings. One study showed that laboratory rats reared in space could not figure out how to walk properly on Earth due to spinal-cord damage suffered in space. This study also showed that newborn pups, which are born blind, need gravity in order to learn how to hold themselves upright. Other findings confirm that adult subjects, including humans, can fairly easily recover balance and navigational abilities that have been lost in space.

Clearly the importance of gravity in the development of human beings requires further study before individuals can be sent off to colonise space.

4. Answer any two of the following question. [10]
   a) How are cables constructed and used in suspension bridges? (Suspension Bridges)
   b) What do you mean by scientific altitude? Name some qualities of a scientist.
   c) How did the mother do the duties of a mother and citizen? (The mother of a Traitor)
5. Choose the best words to complete the following sentences. [5]
   a) He knew that he had a toothache while he ..... his teeth. (brushed, was brushing, had brushed)
   b) People dispersed as soon as they ..... and explosion cheard, were hearing, had heard?
   c) You must respect others in order to ..... (respect, be respective, be respected)
   d) ..... by the police, the suspects put their hands up. (to be warned, as warned, having been warned)
   e) The minister along with his secretaries..... been invited. (has, have)
   f) Some furniture ..... needed for the office. (is, are)
   g) If she ..... in your place, she would resign immediately. (was, had been, were)
   h) Anything ..... if the neighbors had not been there. (could happen, can happen, could have happened)
   i) I object ..... your coming late. (to, for, at)
   j) That woman has to care ..... three children. (to, for, by)
6. Arrange the following into APA and MLA styles of citations. [4]
   Author's name: Nunan, D
   Book name: Understanding Language Classroom
   Publishing place: U.K
   Publisher: Prentice Hall
   Publishing date: 1989
7. As the secretary of Atul Engineering Consultancy Services, draft a notice for its 6th meeting along with 3 agenda. [5]
8. I imagine that you are working on suspension bridge construction project. Write the first monthly progress report of the project in a memo format. [6]
9. Write a short research article on the importance of internet to the engineering students. [10]
10. Imagine that you are asked to write a proposal on the construction of a water storage tank in a remote village. Write the following parts of the proposal. [10]
    Abstract, statement of the problem, objectives.
11. Suppose you are the chief Executives Engineer of a project related to the construction of a road in a remote part of Nepal and the project is to be completed very soon. Write abstract, introduction, methodology and finding of the reports. [10]

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27 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Communication English *(SH601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Edit the text given below: [5]

Incessant practices went up. and the day came when we had to leave to America to study at an advance institute. Always my father was there to guide me. Today, I'm quite a successful pianist, but my father does not stop saying practice more. God smiles and the perfection just glitters when practise touches the top. I now know much than ever that ceaseless effort is the key of success.

2. Read the following text carefully and interpret it so as to make the meaning clear: [5]

The reason why this book has been specially prepared to make it enjoyable reading for people to whom English is a second or foreign language is that an English writer never thinks of avoiding unusual words, so that the learner, trying to read the book in its original form, has to turn frequently to the dictionary and so loses much of the pleasure that the book ought to give.

3. Study the following text carefully. Prepare its note and convert it into summary. [5+5]

We are well acquainted with the fact that men and women are different in terms of appearance. What many people do not realize is that they are also different in communication technique. Generally speaking, men and women fall into two categories when dealing with communication techniques. When men talk, it is for giving information. This informative speaking is " report talk". " Report-talk" is defined as " public speaking". Women on the other hand, use " small talk" to communicate." Small talk" is a conversation which is usually considered to be short and meaningless. This communication technique of women is " rapport-talk". " Rapport-talk" in other words is " private speaking".

Without being aware that we are supposed to be different, men and women are at odds with each other. The reason why we become angry or frustrated with the opposite sex is because we have forgotten this fact. They want their opposites to " want what they want " and " feel what they feel". This very attitude makes a path for disappointment and prevents them to take the necessary time to communicate loving about their differences.

Men mistakenly expect women to think, communicate and react the way men do; women mistakenly expect men to feel, communicate and respond the way women do. That is the time when unnecessary friction and conflict occur.

Individuals should be aware that you could use different styles of conversation to fit the information that you are trying to present. You should also never assume that the opposite sex is going to understand what you are trying to say. You should never criticize others who communicate differently than you. Men and women are ruthless about criticizing the opposite sex.

It is never too late to increase the love in your life. You only need to learn a new way. Whether you attain a therapy or not, if you want to have more fulfilling relationship with the opposite sex, it is essential to learn new and healthy ways of relating and communicating.

[5x2]

4. Answer any two of the following questions:
   a. " Even the best technicians should also be good citizens." Do you agree? If yes, why? (Knowledge and Wisdom)
   b. How do modern boilers function? (Steam Boilers)
   c. What is the central theme of " Civil Peace "? (Civil Peace)

[0.5×10]

5. Choose the correct words from the brackets and fill in the blanks:
   a) Look ..... your health (to, up)
   b) I feel the room .....(move, to move)
   c) If I ..... you, I would not do it. (be, were)
   d) I heard him ..... . Narayan Gopal's song (singing, sing)
   e) She cannot part ..... her jewels (from, with)
   f) He died ..... T.B last year. (with, of)
   g) She walked as if she ..... a lot. (drank, had drunk)
   h) He as well as his comrades ..... out (is, are)
   i) The teacher said that ..... are mortal (we, they)
   j) You alone can relieve me ..... this anxiety (from, of)

6. Change the following bibliographic references as indicated in the brackets: [4]
   a. Jones, Leo. (1998). Cambridge Advanced English. CUP: New Delhi. (into MLA)
   b. Sasikumar, J. and Gunshekhar, P. Spectrum. Orient Longman: New Delhi, 1977. (into APA)
   c. Leech, G. and Svartvik, J. A Communicative Grammar of English. ELBS: England, 1975. (into APA)
   d. Quirk, Randolph and Greenbaum, Sidney. (1973). A University Grammar of English. ELBS: England. (into MLA)

7. Write minutes of a recently conducted meeting regarding save the Bagmati River. [5]
8. Suppose you have recently visited a publishing firm. Write a trip report about your observations. [6]
9. Write a proposal on the establishment of "Drinking water scheme of your local VCD/town) including only Abstract, Introduction and Methodology. [10]
10. Write a brief research article on the importance of forest conservation in Nepal. [10]
11. Assume that you are asked to prepare a final report of a power house construction project. Write only the following parts: Title page, Abstract and Recommendation. [10]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri.	Pass Marks	32
Year / Part	III / I	Time	3 hrs.

Subject: - Communication English *(SH601)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt* ***All*** *questions.*
- ✓ *The figures in the margin indicate* ***Full Marks.***
- ✓ *Assume suitable data if necessary.*

1. Edit the following text do as to make it free from errors: [5]

It was then that my brother-in-law spoke to me. I m well aware of the hardships faced by these kashmiri vendors he said as i looked at him still confused. they eat in morning then spend the rest of the day roaming around the city on foot hungry and thirsty. When i saw them i wanted to offer them food. But they have their pride. They would never accept anything unless i pretended to be interested in their wares and made the offer of the food look incidental.

2. Read the following text and interpret its meaning on your own: [5]

Read not to contradict and confute, not to believe and take for granted not to find talk and discourse, but to weigh and consider. Some books are to be tasted, others to be swallowed and some few to be chewed and digested, that is some books are to be read only in parts, others to be read but not curiously and some to read wholly and with diliqence and action. Some books also may be read by deputy and extracts made of them by others, but that would be only in the less important arguments and the meaner sort of books else distilled books are like common distilled waters flashy things.

3. Read the following text carefully make notes and write a summary of it. [5+5]

What is a democratic government to do in a country where people are steeped in ignorance and superstition, where there is opposition or resistance to even mild reforms from vested interests is society? It can be said that if the government is to go by consent or consensus it will not be able to do anything. Could the government ever get the conseut or consensus of the people for abolition of untouchability? But has untouchability been really abolished? Frankly speaking, ever now the code of manu is in operation, the large part of code thus prepared.

No law, perhaps, can come into full operation unless it is acceptable to the people. And it is not necessary to say that acceptability can not come without conviction. The government had been taking measure after measure to change the social-economic structure to remove disparities, social and economic. Not that all the measure have gone in vain. Feudalism has been abolished; gates of universities, legislatures, government service etc. have been thrown open to all castes and communities, exploitation of the weaker section of the people has been considerably reduced.

But there has been no change in the outlook of the people. Politicians and administrators still behave like feudal lords: corruption, favouritism and nepotism have not shown any sign of abatement; faith is caste system and all that it may stand for has not weakened. In one word, independence, democracy etc have not shattered the age-old beliefs and conviction. No wonder the blind is leading the blind.

4. Answer any two of the following question: [5×2]

a) What is the difference between knowledge and wisdom? [Knowledge and wisdom]

b) Describe the importance of English for engineering with reference to your texts in English. [What Einstein Did]

c) Why did the mother kill her son? [The mother of a traitor]

5. Choose the correct words from the brackets: [5]

a) Either you or I ..... Supposed to do it. (are, am)

b) The teacher said that ..... are mortal. (we, they)

c) Time and tide ..... for none. (wait, waits)

d) He as well as his comrades ..... out. (is,are)

e) She walked as if she ..... a lot (drank, had drunk)

f) Look ..... your health. (to, up)

g) She cannot part ..... her jewels. (from, with)

h) I feel the room ..... (move, to move)

i) The government ..... decided to increase the salary of their civil servants. (have, has)

j) He died ..... T.B. last year. (with, of)

6. Transform the following bibliographic reference as indicated in the brackets. [4]

a) Perkin, H.C. (1975). Air pollution. Mc Graw Hill: New Delhi. (into MLA)

b) Hall, Dauglas. (1989). Digital Circuits and Systems. Macmillan: Newyork. (into MLA)

c) Lawrence, T.E. Revolt in the Desert. New York: George H. Dorian, 1927 (into APA)

d) Nadell, Judith, et al. The Macmillan Writer. Boston: Allyn and Bacon, 1997. (into APA)

7. As a secretary of your college union, write the minutes of a recently conducted fifth meeting inventing five agenda. [5]

8. Suppose you have been working on twelve month project. Write the second monthly progress report in a letter format. [6]

9. Imagine that you are requested to submit a proposal for establishing a sophisticated computer lab in one of the technical companies. Write the background, technical section, cost estimate and title page of the proposal that you are going to submit. Also give on outline of the remaining parts. [10]

10. Write a short research article in about 500 words on the effect of air pollution on the local residents in your town. [10]

11. You are asked to prepare a final report of a project of your engineering field. Write only the following parts: Title page, abstract and recommendation. Also, give the outline of the report. [10]

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